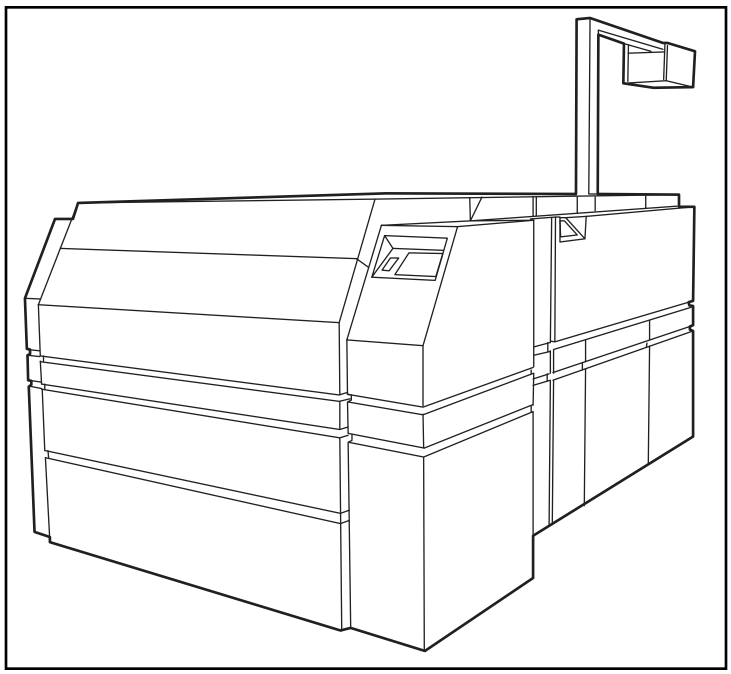
The Avantra 36/44 Service Manual



Part Number
580078-0002

AGFA

AVANTRA 36/44
Service Manual

Prepared by
Customer Documentation
200 Ballardvale Street
Wilmington, MA 01887

Printed in the U.S.A.

580078-0002

Table of Contents

INTRODUCTION

GLOSSARY OF ACRONYMS

SECTION 1: IMAGESETTER

Chapter 1: Imagesetter Installation Procedures

Chapter 2: Imagesetter Functional Analysis

Chapter 3: Imagesetter Diagnostics and Vacuum System Troubleshooting Guide

Chapter 4: Imagesetter Component Removal/Replacement Procedures

Chapter 5: Imagesetter Alignment

Chapter 6: Imagesetter Preventive Maintenance

Appendix A: Specifications

Appendix B: Spare Parts

Index

SECTION II: BRIDGE

Chapter 1: Bridge Installation

Chapter 2: Bridge Functional Analysis

Chapter 3: Bridge Debugger Diagnostic Tool

Chapter 4: Bridge Component Removal/Replacement Procedures

Chapter 2: OLP Functional Analysis

Chapter 3: OLP Component Removal/Replacement

Introduction

About This Manual

This manual contains all of the information you need to unpack, prepare, and install the Agfa Avantra 36/44 and 36S/44S imagesetter, bridge, buffer, on-line processor, and crane.

Warnings, Cautions, and Notes

The terms WARNING, CAUTION, and NOTE have specific meanings in this manual.

- A **WARNING** advises against certain actions or situations that could result in personal injury or death.
- A **Caution** advises against actions or situations that could damage equipment, produce inaccuracies, or invalidate a procedure, although direct personal injury is unlikely.
- A **Note** provides useful information.

Imagesetter Safety Information

Laser Safety

WARNING: Looking directly into the laser beam or laser beam reflection can cause permanent eye damage.

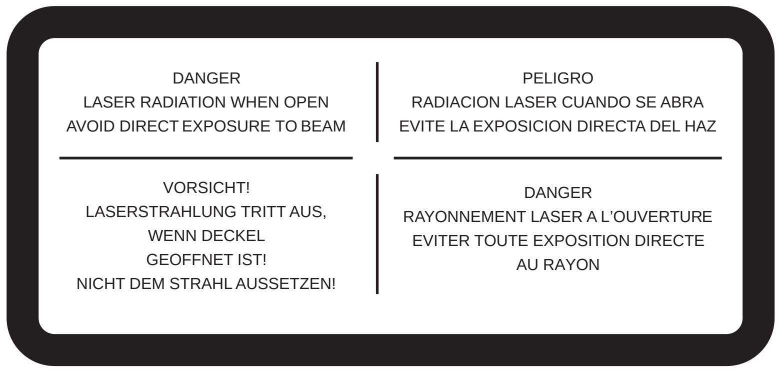
The Avantra is a class 1 laser radiation device and is harmless during normal operation. However, during certain system alignments and tests, the laser is considered a class 3B device. In this classification, the laser can be harmful to your eyes.

The laser presents no danger as long as the protective covers are in place. When the protective covers are removed, follow these safety rules:

- Never look directly into the beam.
- Never expose other persons to the laser beam.
- Use caution with tools and other reflective surfaces to prevent laser reflection.
- Keep the work area well lit.
- Follow the assembly/disassembly procedures precisely. No short cuts. These procedures are in the Imagesetter section (Section I), Chapter 4, “Imagesetter Component Removal/Replacement Procedures”.
- Never operate the laser with the covers removed from the Avantra system.
- Promptly report any actual or suspected accidents. The service engineer must report immediately to a medical facility if he or she experiences any of the following eye symptoms:
    - A visual halo effect
    - A change in tearing (eyes wetter or drier than normal)
    - A change in the way colors are seen

Labeling

Various warning and compliance labels are attached to the Avantra 36/44.

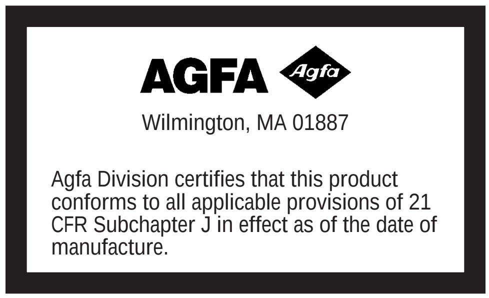


Multilingual warning label.

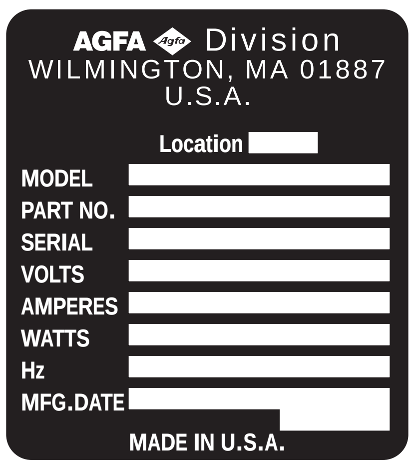
Laser class label.

NOTE: The figure above indicates the class of laser radiation during operation and maintenance.

WARNING: Class 1 lasers are considered safe for operator access in accordance with the Code of Federal Regulation and international standards.



CDRH compliance label.



Manufacturer's identification label.

On-Line Processor (OLP) Safety Information

If the OLP is part of the system, operate using the following safeguards:

- Do not operate the OLP if it is not level.
- Be careful not to touch the dryer when the top cover is removed. The dryer gets hot during operation and should be allowed to cool before servicing.

- To protect against the hazard of electric shock, do not allow water to run or spill into the electical compartment or components.
- Before servicing, always disconnect the electric power or unplug the power cable at the mains.

NOTE: The OLP has six built-in safety switches, which disconnect all power whenever the top lids are opened.

- The processor contains a lithium battery.

WARNING: The battery may explode if mistreated. Do not recharge or disassemble. Follow local rules for the disposal of lithium batteries.

When handling chemistries, always follow the safety procedures described by the manufacturers.

Service Manual Audience

This manual is intended for service engineers. It assumes prior knowledge and experience with the internal workings of an image processor.

Refer to the *Removal/Replacement Procedures* chapters present in each section before attempting to service the inside of an Avantra 36/44 imagesetter, processor, bridge, buffer or crane.

NOTE: The intent of the *Removal/Replacement Procedures* chapters in this manual are not to repair the units to the level of their individual components (e.g., the chips on the boards). They provide instructions for replacing modules (e.g., the control panel assembly, power supplies, motors, sensors, etc).

Manual Overview

This manual has the following arrangement:

Section I: Imagesetter

Chapter 1: Imagesetter Installation Procedures

Provides installation instruction including unpacking, unlocking, site preparation and system set-up procedures for the imagesetter.

Chapter 2: Imagesetter Functional Analysis

Presents an overview of the Avantra 36/44 imagesetter and describes the function of subsystems, modules, and submodules.

Chapter 3: Imagesetter Diagnostics

Describes the tools used to diagnose and troubleshoot the Avantra.

Chapter 4: Imagesetter Component Removal/Replacement Procedures

Provides the procedures for removing and replacing components within the Avantra imagesetter.

Chapter 5: Imagesetter Alignment Procedures

Provides the procedures for aligning and adjusting the Avantra 36/44 imagesetter.

Chapter 6: Imagesetter Preventive Maintenance

Describes the procedures for inspecting and cleaning the Avantra 36/44 imagesetter.

Appendix A: Specifications

Lists the Avantra 36/44 specifications for the imagesetter including physical, electrical, environmental, and functional data.

Appendix B: Spare Parts

Index

Section II: Bridge

Chapter 1: Bridge Installation Procedures

Provides the information necessary for installing the internal bridge.

Chapter 2: Bridge Functional Analysis

Provides an operational and functional overview of the Avantra's internal bridge.

Chapter 3: Bridge Debugger Diagnostic Tool

Describes the set-up and use of this tool for diagnosing problems associated with the bridge and buffer.

Chapter 4: Bridge Component Removal/Replacement

Provides the procedures for removing and replacing defective components within the Avantra bridge.

Appendix A: Spare Parts

Index

Section III: Buffer

Chapter 1: Buffer Installation Procedures

Provides the information necessary for unpacking, unlocking and installing the Avantra buffer.

Chapter 2: Buffer Functional Analysis

Provides an operational and functional overview of the Avantra's buffer.

Chapter 3: Buffer Component Removal/Replacement

Provides the procedures for removing and replacing defective components within the Avantra buffer.

Chapter 4: Buffer Preventive Maintenance

Describes the procedures for inspecting and cleaning the Avantra buffer.

Appendix A: Spare Parts

Index

Section IV: On-line Processor (OLP)

Chapter 1: OLP Installation Procedures

Provides the information necessary for unpacking, unlocking and installing the Avantra OLP. Included are the electrical, plumbing, and other physical requirements that must be met.

Chapter 2: OLP Functional Analysis

Provides an operational and functional overview of the Avantra's OLP, including descriptions of the electronics, boards, and sensors.

Chapter 3: OLP Component Removal/Replacement

Provides the procedures for removing and replacing defective components within the Avantra OLP.

Chapter 4: OLP Preventive Maintenance

Describes the procedures for inspecting and cleaning the Avantra buffer.

Appendix A: Specifications

Lists the Avantra 36/44 specifications for the OLP and buffer including physical, electrical, environmental, and functional data.

Appendix B: Spare Parts

Appendix C: Wiring Diagrams

Index

Section V: Crane

Chapter 1: Crane Mounting Instructions

Explains how to unpack and install the Avantra 36/44 crane, which attaches to the OLP.

Chapter 2: Crane Component Removal/Replacement Procedures

Provides the procedures for removing and replacing components within the OLP crane.

Appendix A: Spare Parts

Index

Product Description

The Avantra 36 and 44 are members of the Avantra family of high-end laser based PostScript image recorders. They build upon the Avantra 20/25 advanced capabilities and add new features. The Avantra 36/44 line is especially designed for users requiring large format output, such as packaging and posters. Both systems support the high quality imaging requirements needed for CristalRaster.

Standard Equipment

The Avantra contains the following standard equipment:

- Punch system
  - head and tail
  - Stoesser, Bacher, or Bacher Plate
- Multiple media supply capability
  - allows two different (or same) media to be on line within the engine at the same time
- Flex media
  - automatically adjusts focus for the selected media thickness
  - user-definable media widths

Advanced Features

In addition to the advanced design features of the 20/25, the 36/44 has:

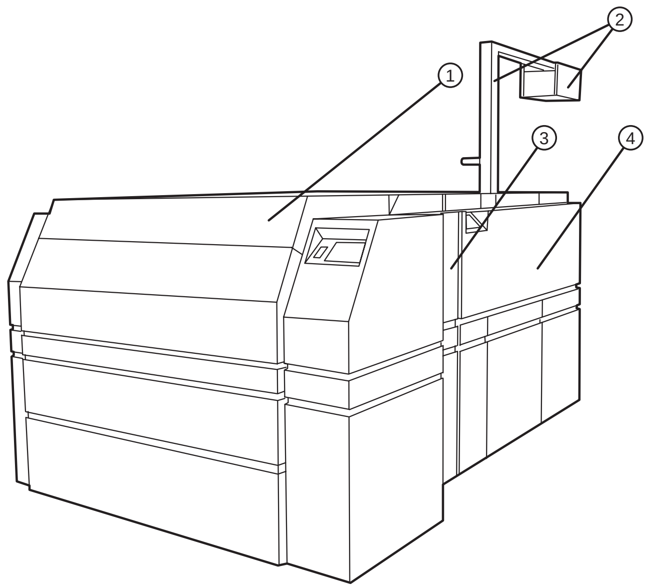
- EasyLoad media handling, which allows the convenient loading of large format supply cassettes.
- Vacuum system, which aids in keeping the media tight against the drum for optimum image quality.
- Integrated on-line processor with bridge/buffer/crane (optional).

Options

Options include:

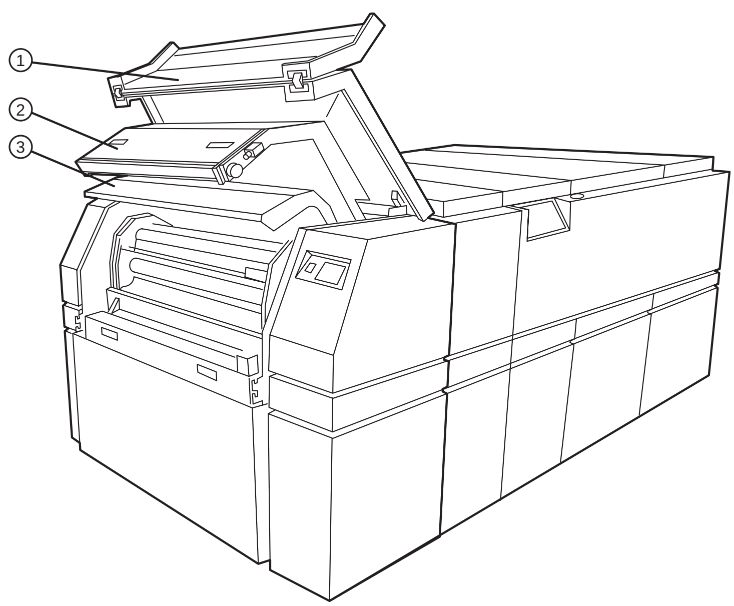
- On-line bridge buffer
  - bridge is contained within the engine
  - buffer is a separate unit attached to the back of the imagesetter, which allows a full page to be buffered while imaging the next page
  - crane for loading and unloading off-line cassettes
  - standard cassette can be easily used if a problem with the bridge/ buffer is encountered
- Custom punches
- Easyload media handling cart

The following illustrations show the imagesetter with all the OLP options installed and attached.



The Avantra 36/44 imagesetter, buffer, and crane.

①–Imagesetter. ②–Crane. ③–Buffer ④–On-line Processor (OLP).



The bridge.

①–Top cover. ②–Bridge. ③–Light shield.

Glossary of Acronyms

Introduction

This glossary contains acronyms used in the *Avantra 36/44 Imagesetter Service Manual* and in scanning environments in general. For more information about an acronym, see the index in this manual.

ALB	Agfa Light Diode Board
APIS	Agfa Print Engine Interface Standard
ATB	Agfa Terminal Board
AT	Attention Command
AVDIAG	Avantra Diagnostic Program
BOL	Beginning Of Line
BCC	Basic Confidence Check
CSDM	Carriage Sensor Driver Module
DEC	Digital Engine Controller
DSP	Digital Signal Processor
DVM	Digital Volt Meter
FPGA	Field Programmable Gate Array
FRU	Field Replaceable Unit
ICS	Image Control System
LCB	Luth Computer Board
LCD	Liquid Crystal Display
LDD	Laser Diode Drive
LDM	Laser Driver Module
LMB	Luth Motor Board
LPB	Luth Power Board
OLP	On-Line Processor

PCB	Printed Circuit Board
PLL	Phase Lock Loop
PWM	Pulse Width Modulation
RAM	Read Access Memory
RIP	Raster Image Processor
ROM	Read Only Memory
SDM	Sensor Driver Module
SGM	Spot Generation Modules
SPI	Serial Peripheral Interface
TSDM	Take-up Side Media Transport
T/U	Take-Up

Section I: Imagesetter

Chapter 1:
Imagesetter Installation Procedures

1.1 Introduction

This chapter describes the requirements and procedures necessary for installing the Avantra 36/44 imagesetter.

Included in this chapter are:

- Customer Pre-site Checklist
- Service Engineer Installation Procedure
    - Pre-installation Checks
    - Upacking the Imagesetter
    - Unlocking the Imagesetter
- Checking the System
- Customer Application Training

1.2 Customer Pre-site Checklist

The customer should use the following pre-site checklist to ensure that the intended installation site is properly prepared to receive and install the Avantra 36/44 image-setter.

- Power Requirements

  The customer must provide a separate (isolated) three wire 115/230 VAC grounded power line. The wires can be run in conduit, but the conduit *cannot* serve as a ground. The receptacle type must be a 2 pole, 15 amp grounded, NEMA 5-20R or equivalent. Electrical specifications for the imagesetter are:

Volts:	115/230
Amp:	5 / 2.5
Rec:	NEMA 5-20R
Power:	575 Watts
Heat Output:	1962 BTU's

If the customer is setting up the optional on-line processor (OLP)/buffer as well, the OLP electrical specifications are:

Volts:	230
Amp:	30
Rec.:	NEMA L6-30P
Phases:	1, 2 or 3 phases + (neutral) + ground
Load:	Maximum 7.0 kW

- Environment

  The system should be located in a clean, static free work area for best operation. The system must not be placed near heating or air conditioning equipment. The customer must provide the proper work environment as described in *Work Space* below. Environmental specifications for the imagesetter include:

Oper/Temp:	65° to 80° F (18° to 27° C)
Humidity:	45 to 55%, non-condensing

  For absolute accuracy 70° F ± 3° (21° C ± 2°).

- Work Space

  The system should be located in an area that allows enough surrounding space to permit unrestricted air flow and service access. Approximately three feet should be left on all sides. No overhead lights should appear directly over the system. The system should not be located near windows with direct sunlight. The floor where the Avantra 36/44 imagesetter is to be placed must meet the industrial standard for weight per square foot (100 lbs/sq.ft.). Avantra's imagesetter physical specifications are:

Width:	73" (185.42 cm)
Height:	48" (121.92 cm)
Depth:	35" (88.90 cm)
Weight:	1700 lbs. (771.11 kg)

If the customer is setting up the optional on-line processor (OLP)/buffer as well, their physical specifications are:

Buffer

Width:	61" (154.94 cm)
Height:	54" (137.16 cm)
Depth:	15" (38.10 cm)
Weight:	200 lbs. (90.72 kg)

On-line Processor (OLP)

Width:	61" (154.94 cm)
Height:	54" (137.16 cm)
Length:	66" (167.64 cm) excluding receiver tray 98" (cm) including receiver tray, roll mat. 120" (cm) including recevier tray, sheet mat.
Weight:	937 lbs. dry (425.02 kg) 1136 lbs. wet (515.28 kg)

- Telephone Requirements

  A modem connected to the system provides remote diagnostic capabilities. If a modem is attached, a dedicated (or multiplexed) telephone line must be provided. A voice phone line in close proximity to the system is also highly recommended. The phone line connector must be an RJ11C type connector.

- Film Processor Requirements

  It is recommended that a customer producing color separations use a deep tank film processor. An AGFA processor is preferred (i.e. RAPILINE 44 OLP and P). The processor must be able to handle media widths of 36inches or greater. If a new processor is to be installed, electrical requirements for the processor must also be considered. Refer to the film processor's specification sheet/manual for this information.

- Miscellaneous

  Before installation, the customer should also consider the following:

  - Doorways–must be at least 73" (185.42 cm) wide for the Avantra imagesetter to pass through.
  - Elevator–physical inside dimensions and load capacity of the elevator must be able to handle the transporting of the system to the desired floor. The Avantra imagesetter dimensions and weight are listed in *Work Space* above.

- Cables–the system must be located so that the Agfa Print Engine Interface Standard (APIS) cable between the Avantra and the RIP is of sufficient length. Verify that all network and interface cables are of correct length for other equipment to be installed (e.g., scanners and front-ends).
- Densitometer–a required tool for producing high quality film separations. Overall exposure and dot gain of the imagesetterneeds to be checked to insure optimum and repeatable results. If a customer does not currently own a densitometer, one may be purchased from a graphic arts dealer. A transmission densitometer is needed to measure film, and a reflective model for paper.
- Light Table–a table surface of at least 54x72 inches is strongly recommended for viewing separation films produced on the Avantra.

1.3 Service Engineer Installation Procedure

The following four procedural steps must be performed sequentially by the Agfa service engineer:

1. Agfa pre-installation checks
2. System unpacking
3. System unlocking
4. System installation
5. Customer application training

1.3.1 Pre-installation Checks

This section contains a pre-installation checklist. Prior to unpacking, inspecting, or installing the equipment the service engineer must verify that :

- An isolated 115/220 VAC grounded line service to the Avantra has been installed.
- The AC service line to the Avantra contains a 15 amp fuse or circuit breaker.
- The AC service line has a NEMA 5-15R wall receptacle or equivalent.
- The proper system operating environment exists.
- There is adequate work space around the Avantra for service and maintenance access.
- If a modem is to be installed, there should be a dedicated telephone line for the system.

1.3.2 Unpacking the Imagesetter

Tools Required:

A tool kit is packed inside the imagesetter crate. Remove the kit at Step 5 below and check it against Figure 1-1.

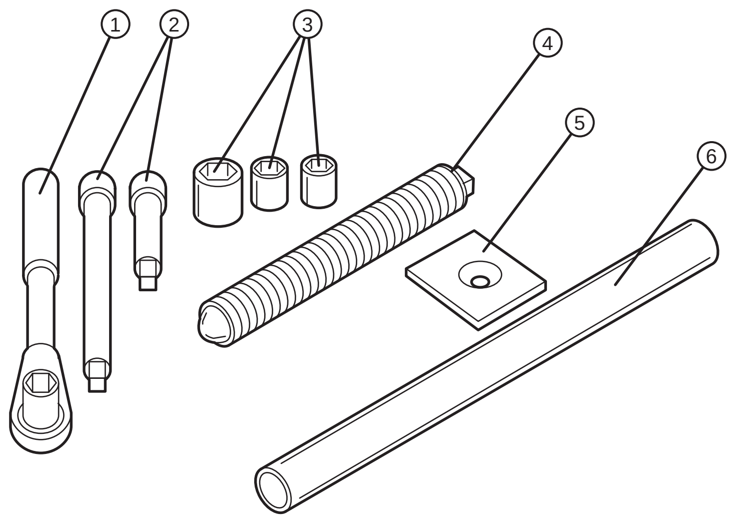


Figure 1-1 The imagesetter tool kit.

①–Ratchet. ②–Ratchet extensions. ③–Sockets.
④–Jack Screw. ⑤–Jack screw (dimpled) plate. ⑥–Breaker bar.

NOTE: **A 5/8" deep socket wrench is also required.**

Steps:

1. Position the crate in the location that the system will be installed. Check for proper clearances around system as listed in *Appendix A: Specifications*. Cut the shipping straps holding the crate panels to the pallet. Refer to Figure 1-2.
2. Remove the top pad. Refer to Figure 1-2.
3. Remove the crossbars, left and right, at the top of the open crate. Refer to Figure 1-2.
4. Remove the two (2) bottom bolts on the front and back of the crate panels. Refer to Figure 1-2.
5. Remove the spring clips (or bolts), three on each end, from the corners of the crate. Remove the four wooden crate panels. Refer to Figure 1-2.

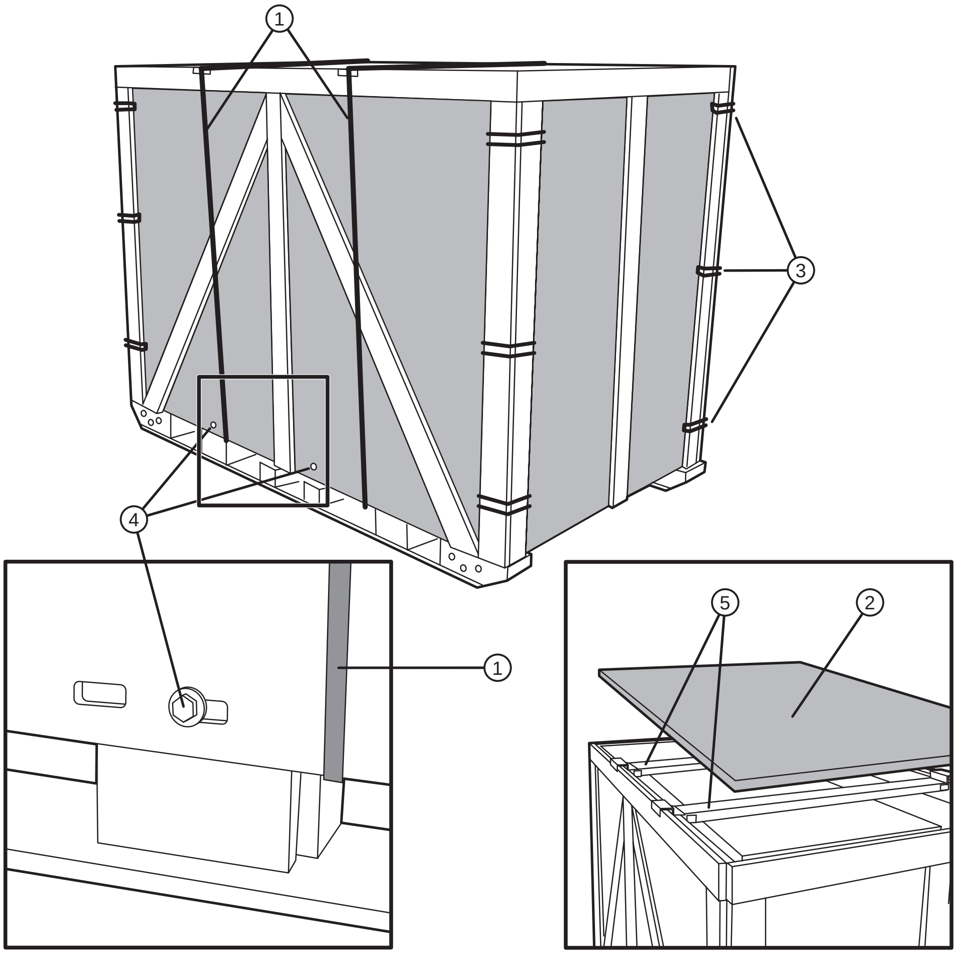


Figure 1-2 Removing the outer shipping crate.

①–Shipping straps. ②–Top pad. ③–Spring clips or bolts.
④–Shipping bolts (2 on each side). ⑤–Two crossbars.

6. Remove the parts list and accessory box. Refer to Figure 1-3. Put the acce-sory box aside for the unlocking and installing procedures.
7. Remove the three (3) bolts at each corner of the end supports. Refer to Figure 1-3.

   The end supports hold the end plates in place.
8. Remove the end plates, one at each end. Refer to Figure 1-3 and Figure 1-4.

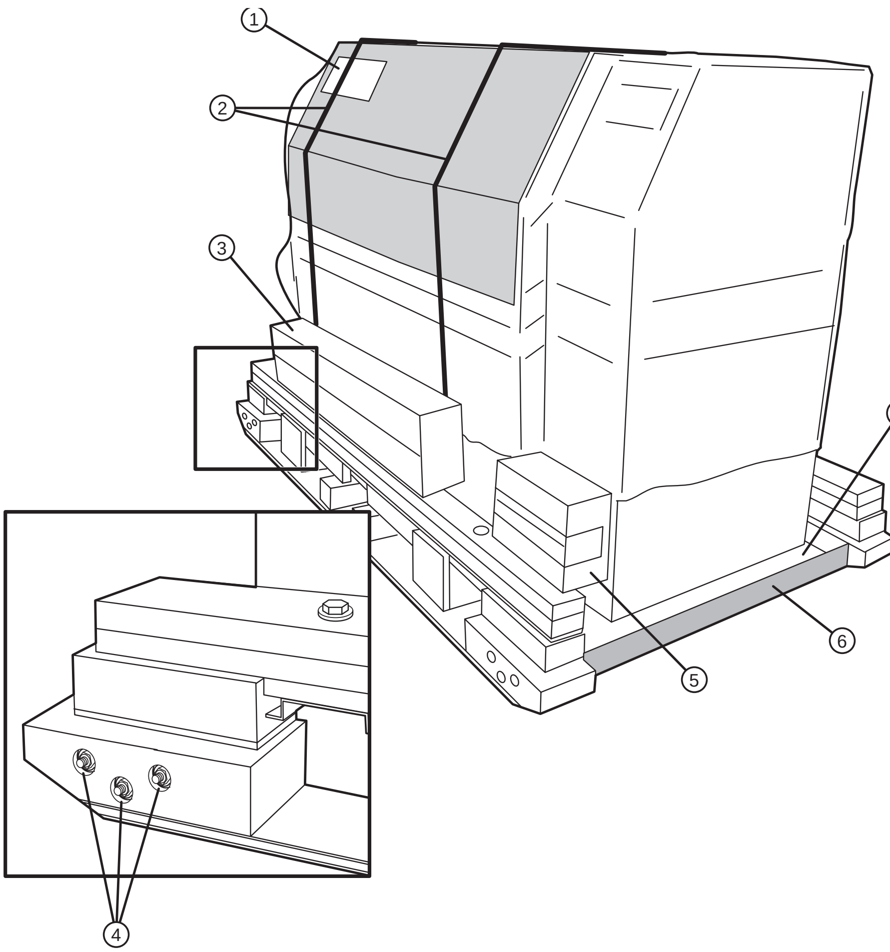


Figure 1-3 Preparing to remove the plates, diapers and skis.

①–Parts list package. ②–Shipping straps. ③–Accessory box.
④–End support bolts with washers. ⑤–Tool kit. ⑥–End plate. ⑦–Diaper.

9. Cut the two (2) large tie wraps at the center channel, front and back. Refer to Figure 1-4.

   The bottom diaper should fall to the ground.

10. Remove the bottom diaper by sliding it out from either side of the pallet. Refer to Figure 1-4.

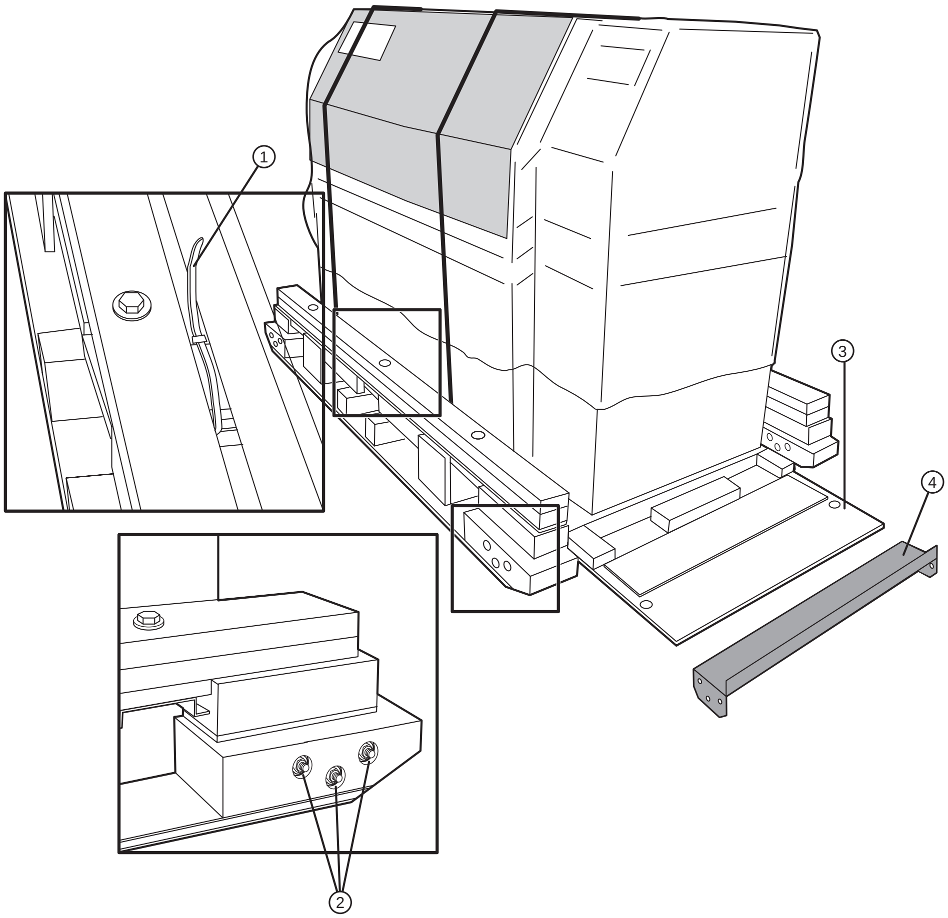


Figure 1-4 Removing the diaper and end plates.

①–One of two tie wraps. ②–End bolts (3 at each corner). ③–Diaper (removed). ④–End plate, 1 at each end (removed).

11. *Loosen* the two (2) outer channel bolts on either end. Refer to Figure 1-5. Allow only a small gap of 1/8" between the bolt heads and the beams.

WARNING: Do not remove the outer channel bolts. Doing so may result in the imagesetter falling off the jack screw (see succeeding steps).

The two (2) end bolts hold the channel beams (wood) to the end channels (metal). The middle bolt holds the center channel; do not remove this bolt until Step 13.

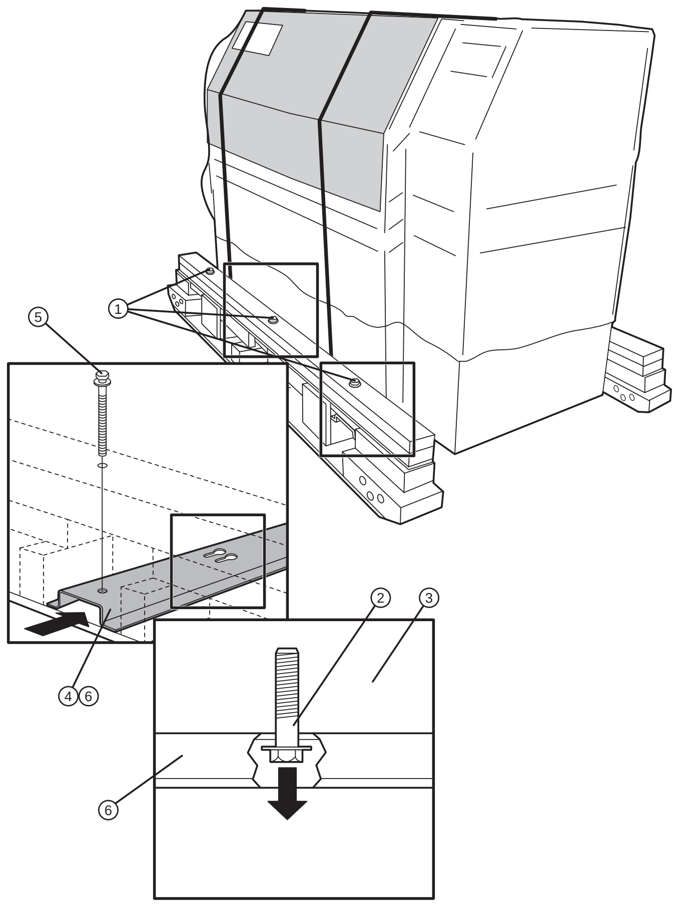


Figure 1-5 Removing the channel bolts.

①–Outer channel bolts (3 per skid). Loosen the two bolts at each end first, leaving the center bolt in place. ②–Inner channel bolts (4 per end channel) connecting the end channels to the imagesetter frame. ③–Imagesetter frame. ④–End channel (1 of 2). ⑤–Outer channel bolt. ⑥–End channel.

12. *Loosen* the four (4) inner channel bolts, left and right, on the bottom of the end channels. Refer to Figure 1-5.

WARNING: Do not remove the bolts.

---

13. Remove the two (2) center channel bolts, one on each side of the center channel. Refer to Figure 1-5. The bolts hold the center channel to the pallet beam. There are no bolts holding the center channel to the imagesetter frame. Once the center channel bolts are removed, the channel should fall.

14. Slide the center channel toward the rear and remove.

15. Cut the two (2) packing straps around the unit to remove the cardboard and plastic covers. Refer to Figure 1-6.

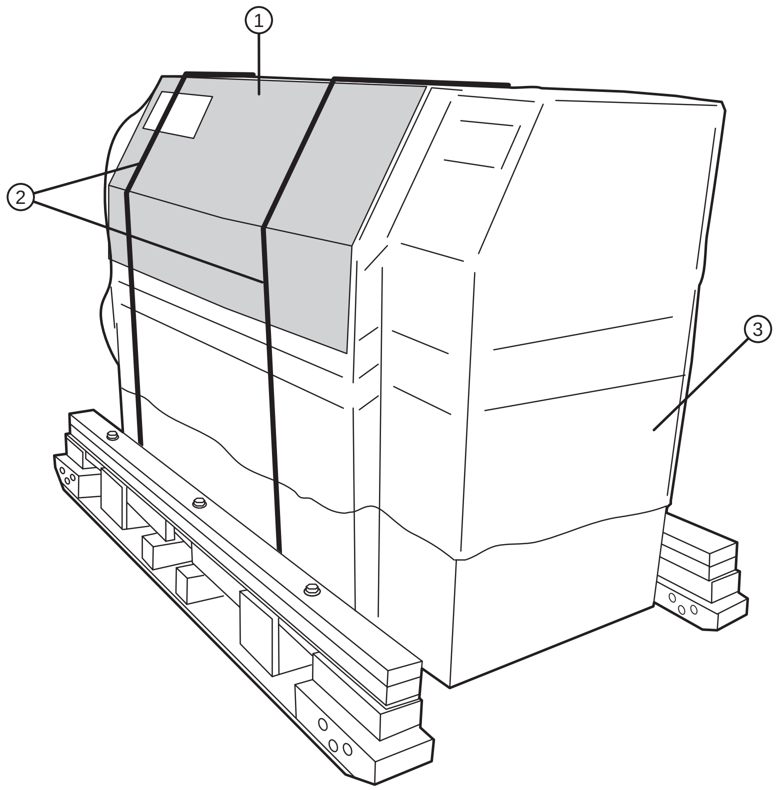


Figure 1-6 Removing packing materials from the imagesetter.

①–Cardboard covering. ②–Packing straps. ③–Plastic cover.

16. Open the imagesetter door on the left side. See Chapter 4, Section 4.2.2, Top, Middle, and Bottom Front Panels.
17. Working within the opened (left) end, position the jack screw provided (see Figure 1-1) in the access hole in the end cap located at the bottom of the frame. Refer to Figure 1-7.
18. Before lowering the jack screw to the floor, position the jack screw plate so that its dimple is directly below the access hole. Refer to Figure 1-7.

CAUTION: The jack screw (dimpled) plate protects the floor from possible damage from the jack screw.

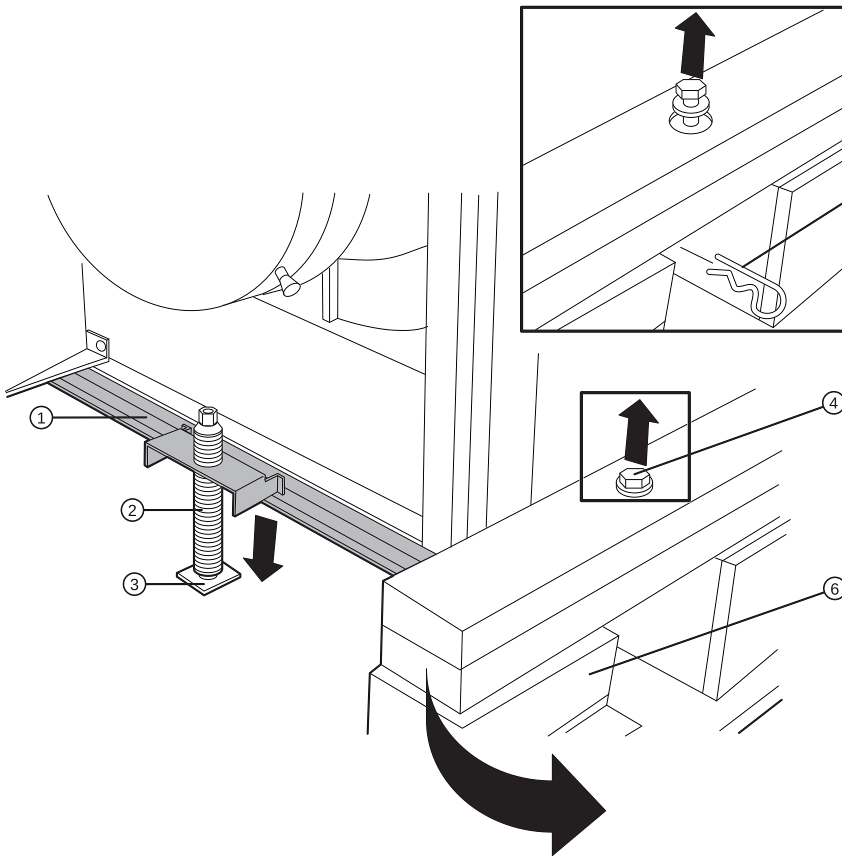


Figure 1-7 Using the jack screw and plate for raising the imagesetter (left side).

①–End plate. ②–Jack screw. ③–Jack screw (dimpled) plate.
④–Outer bolt (1 of 2). ⑤–Spring clip. ⑥–Skid.

19. Turn the jack screw until the unit begins to lift on the plate. Raise the unit only an inch from the ground.
20. Release the unit from the pallet by removing the two (2) outer bolts and their spring clips. Refer to Figure 1-7.

CAUTION: Leave the door slightly ajar before lowering the unit. Doing so prevents the door fom hitting the floor first.

---

21. Lower the unit to the floor by turning the jack screw.

NOTE: Use the breaker bar on the wrench handle, if necessary.

---

22. Remove the end cap and jack screw from under the unit.

WARNING: Block the wheels on the left side of the unit to keep the unit from rolling during the next steps.

---

23. Open the right side cover on the unit. See Chapter 4, Section 4.2.2, Top, Middle, and Bottom Panels.
24. Position the jack screw in the access hole between the vacuum pump and the electrical box. Refer to Figure 1-8.

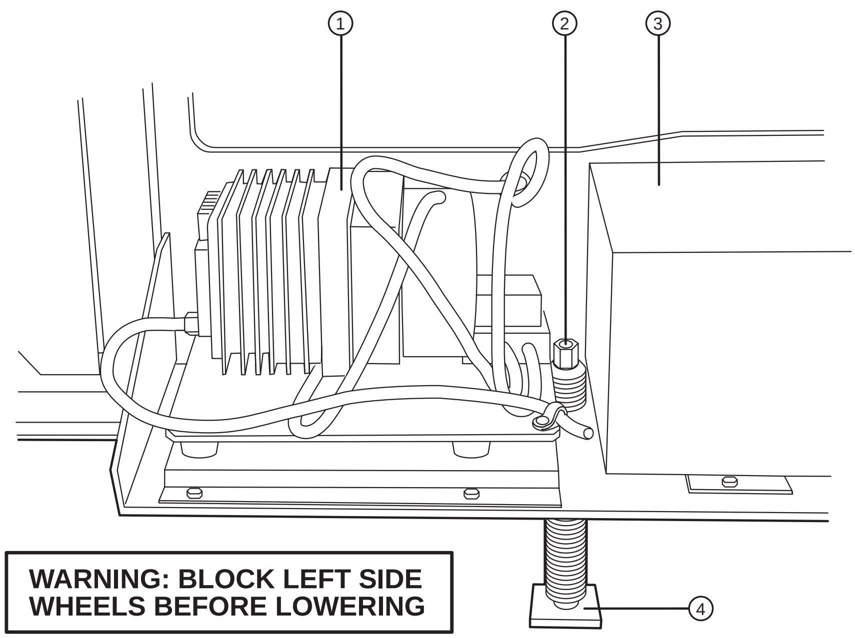


Figure 1-8 Using the jack screw and plate for raising the imagesetter (right side).

①–Pump. ②–Jack screw. ③–Electrical box. ④–Jack screw (dimpled) plate.

25. Position the jack screw (dimpled) plate below the access hole and turn the jack screw until the unit begins to lift. Refer to Figure 1-8.
26. Release the unit from the pallet by removing the two (2) outer bolts and their spring clips. Refer to Figure 1-7.
27. Lower the unit to the ground by turning the jack screw.
28. Remove the two (2) steel channels to the right and left by sliding them free.
29. After unpacking the imagesetter, inspect tor incorrect, missing, or damaged items.

1.3.3 Unlocking and Installing the Imagesetter

1.3.3.1 Imagesetter and Imagesetter to Buffer Accessories Kit

The imagesetter comes with an accessory kit. Check the contents of this box against the hardware illustrated in Figure 1-9.

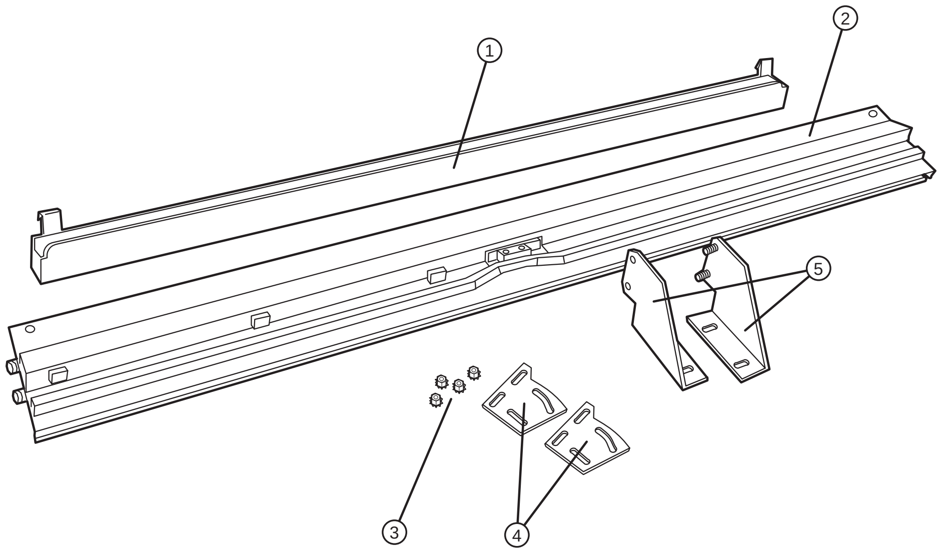


Figure 1-9 Accessories for installing the imagesetter and for attaching the imagesetter to the buffer.

①–Chafe tray. ②–Extension platen. ③–Nuts for attaching the side plates to the platen and the brackets to the imagesetter frame. ④–Side plates. ⑤–Brackets.

The chafe tray is part of the imagesetter installation hardware. The extension platen and related hardware are used when attaching the imagesetter to the buffer. See *Avantra 36/44 Buffer Service Manual*, Chapter 1.

Steps:

1. Remove the foam strips between the front panels and frames. Refer to Figure 1-10.

   See Chapter 4, Section 4.2.2., Top, Middle, and Bottom Front Panels for removing the front panels.

2. Lift the top cover and remove the packing strips on the frame rests, left and right. Refer to Figure 1-10.

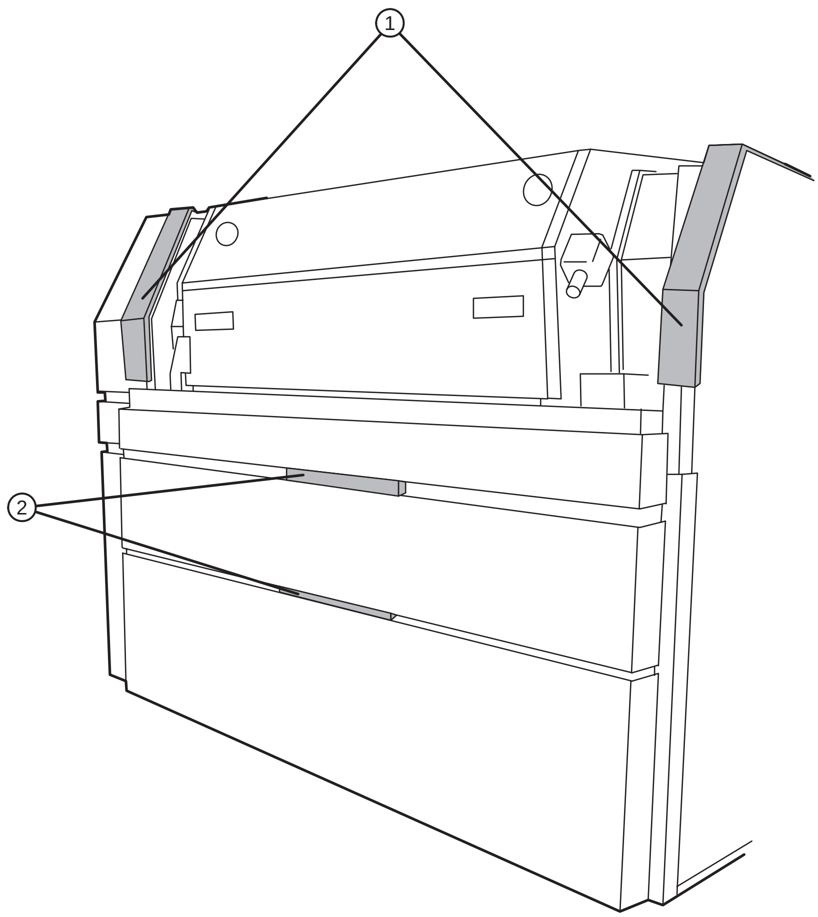


Figure 1-10 Removing the packing materials from the front of the imagesetter.

①–Cardboard packing strips. ②–Foam packing strips.

3. Remove the cardboard packing and the two (2) plastic inserts near the top of the imagesetter's back panel. Refer to Figure 1-11.

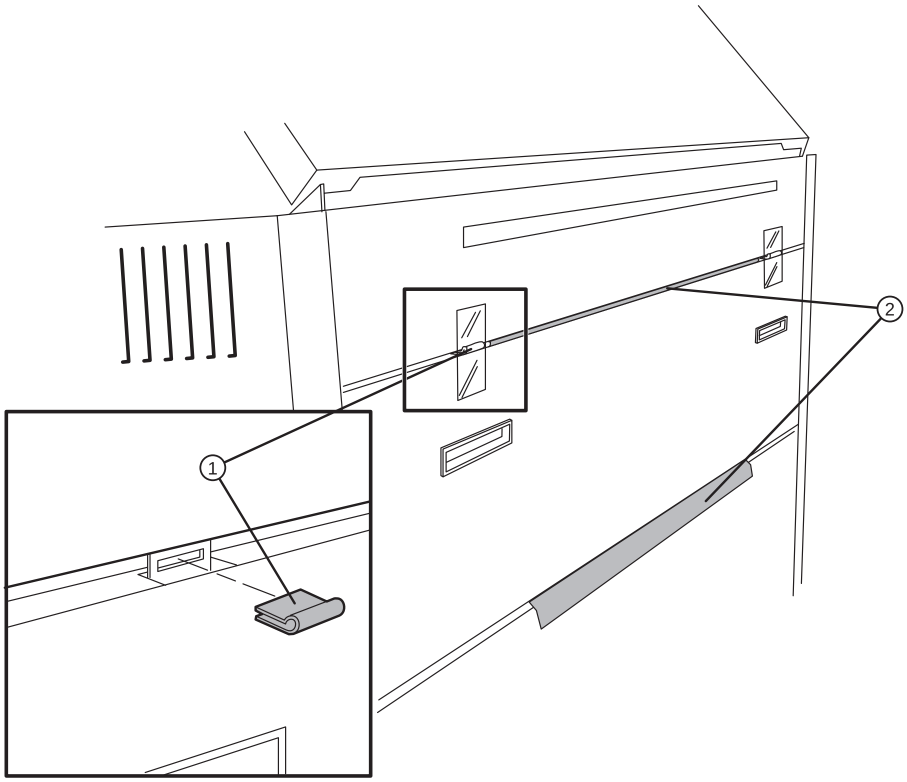


Figure 1-11 Removing the packing materials from the rear of the imagesetter.

①–One of 2 plastic inserts. ②–Cardboard packing.

4. With the top cover open, remove the four (4) screws in the bridge tie down bracket (red) in the lower left and lower right corners of the bridge foot. Refer to Figure 1-12.

   Reinsert the screws into the bridge holes once the bracket is removed.

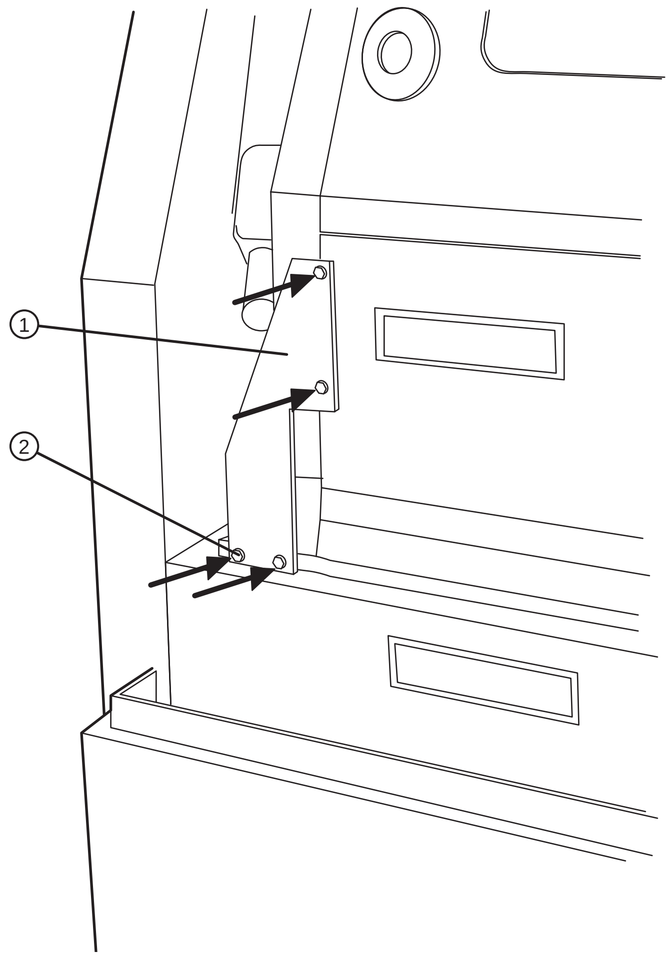


Figure 1-12 Removing the tie down bracket.

①–Bridge tie down bracket. ②–Four hex screws. ③–Supply tray.

WARNING: Do not lift the bridge unless the system has been put in 'light mode.' To initiate light mode, the imagesetter must first be turned on.

---

5. Lift the bridge and the upper light shield.
6. Remove the front top panel. See Chapter 4, Section 4.2.2, Top, Middle, and Bottom Front Panels, for removing the front panels.
7. Locate the lower media transport Retainer Bracket (black) in the lower left of the exposed unit. Remove the two (2) bracket hex screws. Refer to Figure 1-13.

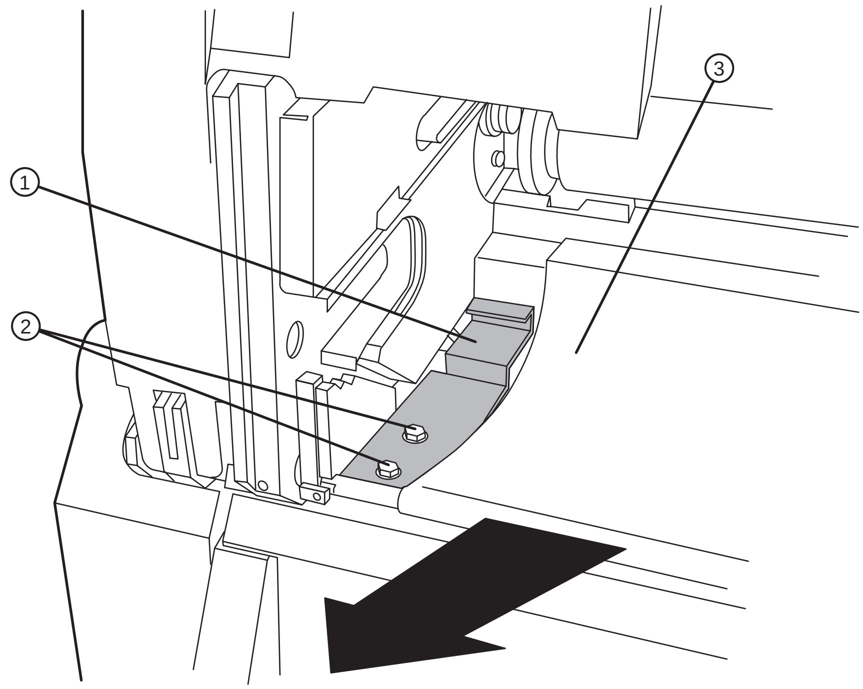


Figure 1-13 Removing the lower media transport retainer bracket.

①–Transport retainer bracket. ②–Two bracket hex screws. ③–Supply tray.

8. Locate the two upper media transport Retainer Brackets (gray) in the upper right and left of the exposed unit. Refer to Figure 1-14. Remove the shipping screw at the center of the bracket.

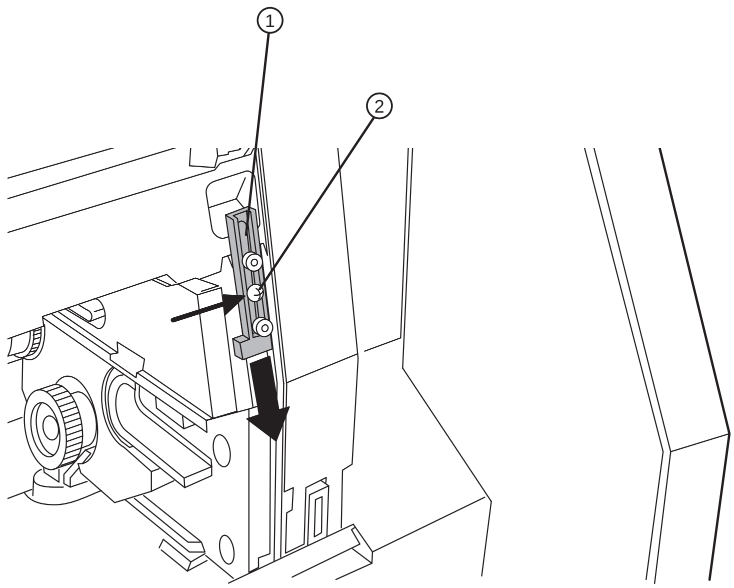


Figure 1-14 Preparing the media transport retainer bracket.

①–Media transport retainer bracket (one of two).
②–Shipping screw (one of two),between two lockdown screws.

9. Locate the take-up light shield in the center of the unit. Refer to Figure 1-15. Remove the shield by unscrewing the three (3) locking knobs and pulling the shield straight out.

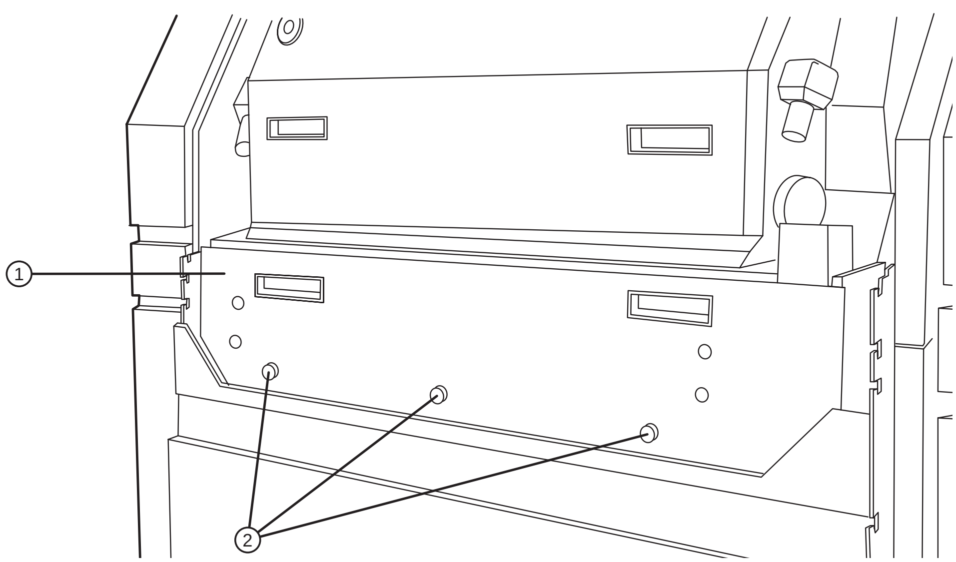


Figure 1-15 Removing the take-up light shield.

①–Take-up light shield. ②–Three shield locking knobs.

10. Insert the chafe tray provided (see Figure 1-9) by hooking the ends into the slots at the bottom and to each side of the exposed area. Refer to Figure 1-16.

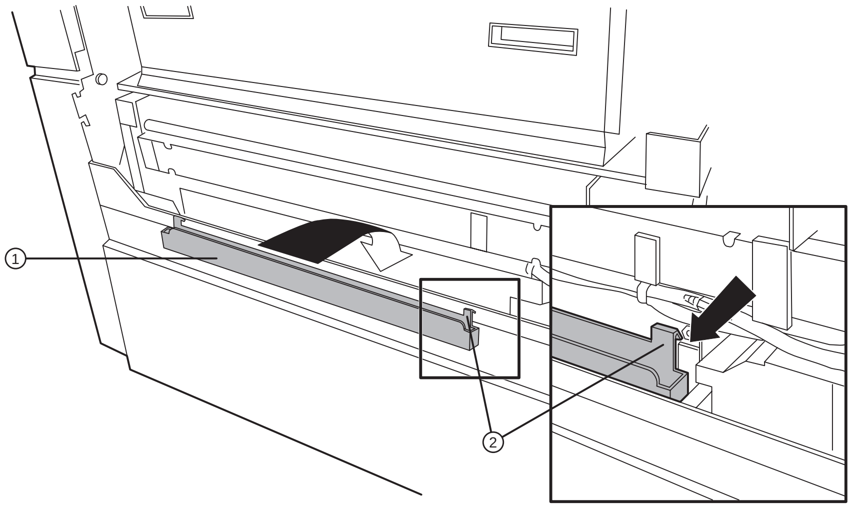


Figure 1-16 Inserting the chafe tray.

①–Chafe tray. ②–Chafe tray hook.

11. Replace the take-up light shield.

Unlocking the Vacuum Pump

1. Open the right-side door
2. Loosen the four hex screws on the orange tie-down bracket that secures the vacuum pump.
3. Remove the orange tie-down bracket.

Unlocking the Carriage

1. Open the left and right side covers. See Chapter 4, Section 4.2.1, Right/Left Side Covers.
2. Remove the light shields, left and right, by pulling each of the five (5) latch knobs out and twisting them so that they rest outside of the lock slot. Refer to Figure 1-17. The light shield on the left requires a twist toward the door to remove. Pull the light shield on the right straight out.

NOTE: When removing the light shield, the interlock switch, located above the shield (see Figure 1-17), automatically shuts off the laser and spin motor.

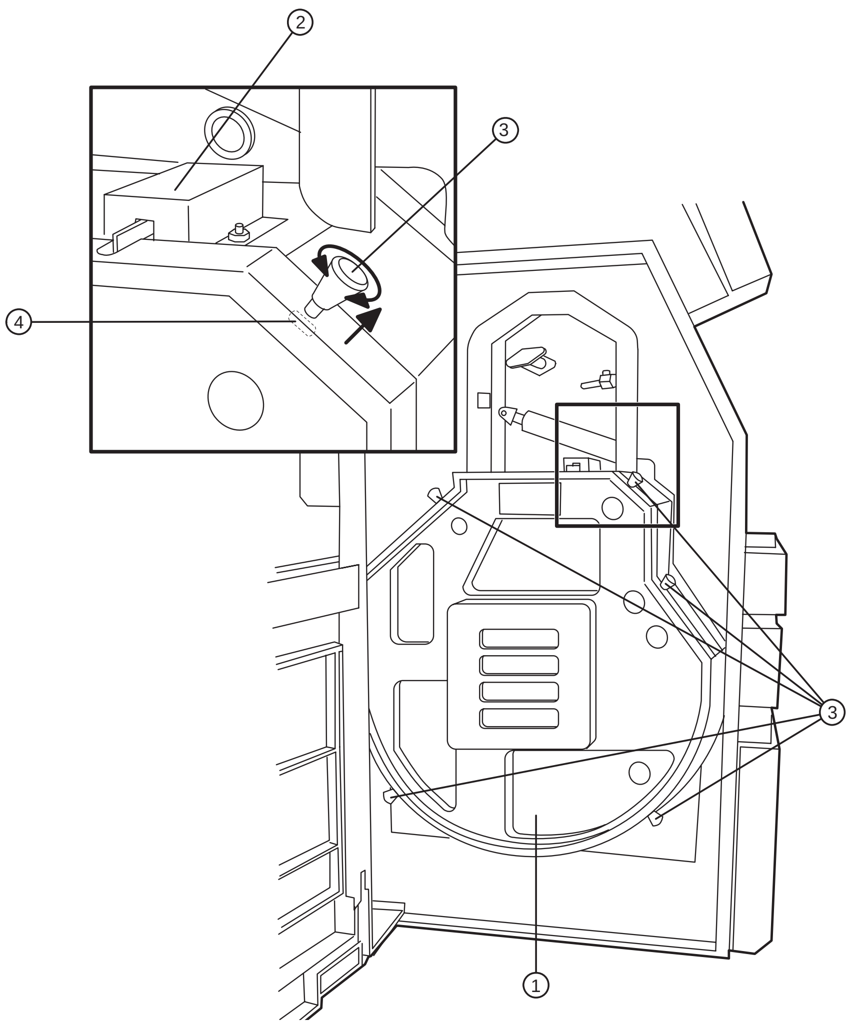


Figure 1-17 Removing the light shields.

①–Light shield. ②–Interlock switch. ③–Five latch knobs. ④–Latch knob lock slot.

3. Remove the 3/8¨ hex bolt in the end stops at each side, left and right, of the carriage. Refer to Figure 1-18.

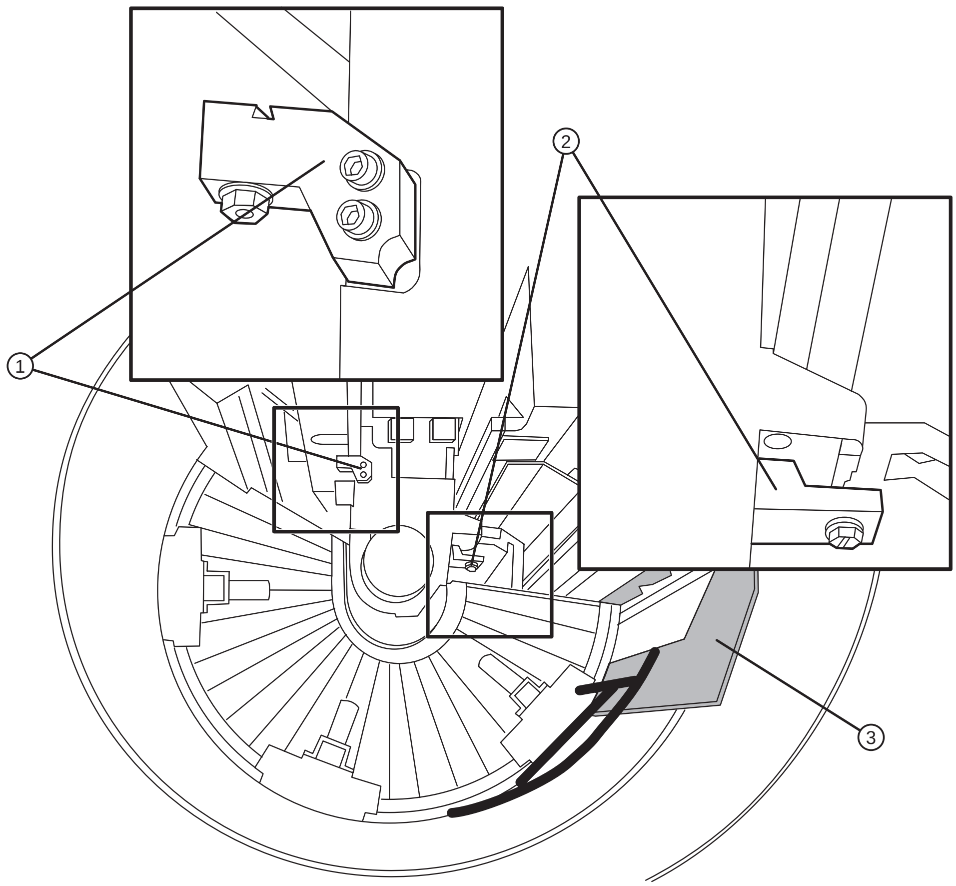


Figure 1-18 Unlocking the carriage.

①–One of 2 end stops (1 on each carriage end). ②–Center stop.
③–Foam pad.

4. Remove the 3/8¨ screw in the center stop.
5. Power up the imagesetter, which makes the flappers lift. Remove the foam pads from the right hand side of the imagesetter. Refer to Figure 1-18.
6. When the carriage comes into the home position, remove the foam from the left hand side of the system. Refer to Figure 1-18.
7. Shut off the imagesetter. Replace the light shields, left and right, and close the left side cover.
8. Turn the system on and make sure that the cooling fans operate. Close the right side cover.

1.4 Checking the System

The following procedures describe how to verify correct system operation and connect properly to the Image Control System (ICS).

Steps:

1. Power the the system on and monitor the progress of the power-up boot diagnostics on the control panel.

   Ensure that no errors occur during the boot sequence and that the system completely loads the application firmware. If errors do occur during the boot cycle, refer to *Section 3: Diagnostics*.

2. Connect the portable PC to the Avantra's diagnostic serial port and start the Avantra Diagnostic Program. Refer to *Section 3: Diagnostics* for more detailed information.

3. Perform the functions listed below with the Avantra Diagnostic Program. Refer to *Section 3: Diagnostics* for more detailed information.

   - Check engine configuration
   - Check image/focus parameters
   - Check media parameters
   - Check DSP parameters
   - Check operator's control panel (OCP) user parameters
   - Check firmware revision levels
   - Check/clear error log parameters
   - Check operational statistics

4. After completing the above checks, save the system parameter files listed below to the portable PC's hard disk. Refer to *Section 3: Diagnostics* for more detailed information.

   - DEC machine parameters
   - OCP user parameters
   - Save DEC (correction tables)

   NOTE: A back-up diskette with appropriate system parameter files is shipped from the factory with each Avantra. The diskette is located in front of the take-up SDM board bracket.

5. Disconnect the portable PC and install the modem as described in *Section 3: Diagnostics*. Perform the following steps:

   - Make a voice connection to the Remote Diagnostic Center, informing them that a manual Avantra dial-out is to take place.

- Power cycle the system. As the system boots, an icon appears on the control panel as shown in Figure 1-19. Press the icon. This initiates an automatic dial-out sequence to the Remote Diagnostic Center.

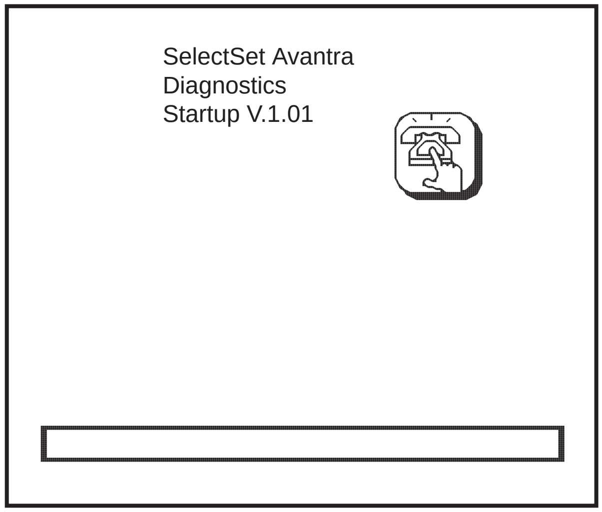


Figure 1-19 Automatic dial-out sequence Icon.

- The download from the Remote Diagnostic Center takes approximately 5 to 6 minutes to complete. During this time the system may reset several times and a service mode icon appears on the control panel as shown in Figure 1-20. The download completes with a final reset allowing the system to load its application firmware. The service mode icon disappears. Installation can now continue.

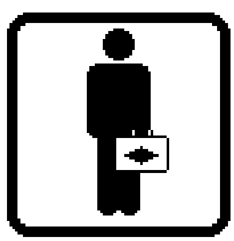


Figure 1-20 Service mode icon.

6. Load one of the supply cassettes with media and load into the system. Enter the appropriate film usage counter value. Change the cassette, media and configuration defaults as necessary. Refer to the Avantra user guide.
7. Using the PC Imager, run an exposure array at each resolution. Use the current density setting (minus approximately 10 steps) on the control panel for a starting density for the array. This insures a density reading on both sides of the current density setting. Measure the density at each resolution and adjust if necessary (approximately 4.2 to 4.6D).

8. After the density has been checked/adjusted for each resolution, run the Avantra Installation files. Run the following list of files:

   - 50% @ 1200, 1800, 2400, 3600
   - m 100/85% @ 2400, 3600
   - m Scale/Fid @ 240

   Run the focus test file and adjust as necessary. Refer to *Chapter 5: Alignment Procedures.*

9. Run the pulse width modulation (PWM) test and adjust as necessary. Refer to *Chapter 5: Alignment Procedures.*

10. Turn the system off. Connect the engine cable (APIS interface cable) to the RIP. Follow the RIP installation procedures and connect it to the appropriate workstation.

11. Turn the system on. Allow the system to boot and load the application firmware. When the RIP icon appears on the control panel, the system is ready. Refer to Figure 1-21. The RIP can now be turned on.

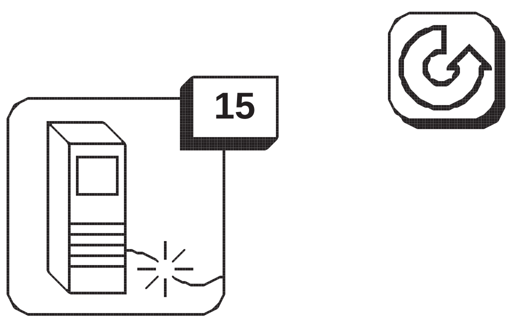


Figure 1-21 RIP icon.

12. Run an appropriate customer test file, which contains text, graphics, and tints, from the workstation. Check for an acceptable output image.

1.5 Customer Application Training

Customer application training is one of the service engineer's responsibilities. Training should be approximately 30 minutes and include the following demonstrations:

- Loading of media into the supply cassette
- Loading and unloading of the media supply cassette into the system
- Procedures for clearing media and cutter jams

The training should include the following instructions:

- Daily/weekly system maintenance routines
- Functionality of the control panel
- Daily operating procedures
- Defining cassette parameters
- Determining proper exposure settings
- Setting system defaults
- System error reporting and brief descriptions of possible solutions to error conditions, which results in reduced numbers of unnecessary service calls

Chapter 2:
Imagesetter Functional Analysis

2.1 Introduction

This chapter presents an overview of the Avantra 36/44 imagesetter. Described here are the functions of all major subsystems, modules and submodules within the system. This chapter covers both electrical and opto-mechanical subsystems, showing the major functional block diagrams for each. Understanding the fundamental operation of the individual subsystems is a valuable aid to service personnel in diagnosing and troubleshooting system level problems.

The following topics are covered:

- System Overview
- Electronics Overview
  - Electronics Packaging
  - System Architecture
- Digital Engine Controller (DEC)
- Operator Control Panel
  - Micro-controller
  - OCP FLASHROM
  - Liquid Crystal Display (LCD)
  - Keypad
  - OLP/Bridge Interface
  - Speaker (Audio Interface)
- Carriage Sensor Driver Module (CSDM)
- Sensor Driver Module (SDM)
  - SDM to DEC Interface
- Laser Driver Module (LDM)

- Power Supply
    - Additional Voltages
    - Power Distribution
    - Power Good
- Optical System Overview
- Spot Generation Module
    - Laser Diode Mount
    - Polarizer
    - Spot Size Changer
    - Spot Forming Lens
    - Weak Lens
    - Beam Compressor
- Spin Motor Module
- Spin Motor
- Mirror
- Encoder
- Linear Carriage Transport Overview
    - Carriage Assembly
    - Linear Bearing Guideway
    - Carriage Home Position Sensor
    - Inner Shrouds
    - Vacuum System
- Media Transport System Overview
    - Supply Side Mechanics
    - Powered Media Take-up Cassette
    - Media Punch/Clamp Assembly
    - Take-up Drive Assembly
    - Media Cutter Assembly
    - Supply Cassette
- Humidifier
    - Sub-Assembly
    - Fan Control Circuit
    - Interface Connections

- Software
- PC Board: LED Descriptions
- Warnings and Indications

2.2 System Overview

The Avantra is a floor-standing unit. It has a simple, language independent control panel, utilizing icons and a touch screen display. The system is designed to interface via the Agfa Print Engine Interface Standard (APIS) to a single Image Control System (ICS), which is packaged separately from the imagesetter.

The Avantra consists of a 211 degree internal drum in which a high-speed spinning deflector moves along the central axis of the drum on a linear carriage. The spinning deflector scans the inner circumference of the drum as it gradually moves along the length of the drum axis.

The medium (paper, film, or plate) feeds automatically onto the drum surface prior to the imaging process. Compression and clamping methods hold the medium firmly against the drum during imaging. There is no medium movement during the process. After imaging, the medium moves into a removable, powered, take-up cassette. The medium can now either be cut with the motorized cutter and removed for processing, or the next job can be imaged and fed into the cassette.

The exposure source is a solid state laser diode (650nm) that focuses to a spot size of 7.7 microns (.30 mil) at the medium surface with a maximum addressability of 3600 pixels per inch. The imagesetter also supports 2400, 1800 and 1200 dpi addressability modes with a proportionately larger spot size.

2.3 Electronics Overview

A multi-controller/FLASHROM system made up of four micro-controllers and three FLASHROMs comprises the Avantra’s electronics:

- Operator control panel (OCP) micro-controller
- Digital engine controller (DEC K1) micro-controller
- DSP micro-controller
- DIAG micro-controller
- OCP FLASHROM
- DEC K1 FLASHROM
- DSP FLASHROM

The micro-controllers link serially via a low-speed bus called the Serial Peripheral Interface (SPI) bus. All data exchanges among the micro-controllers and peripheral devices (e.g., motors D/A and A/D) take place via the SPI bus.

The OCP module, which contains a dedicated micro-controller, is the main controller of the system. User commands originating from the RIP and/or the operator are verified, parsed and either acted upon by the OCP or passed to the DEC. The parsing process includes breaking the macro language of the user into a micro language that is more easily implemented within the engine controller.

The DEC reacts to the micro commands by activating the electromechanical devices within the imagesetter to move media, control the carriage, image media, and generally monitor system operations.

2.3.1 Electronics Packaging

The electronics are packaged on a single main PC board (DEC) with satellite boards providing driver/sensor control for motors, carriage, and laser drive. The DEC contains all the circuitry for the APIS input, image control, slow scan control, spinner, and media system controls. Various communication channels are also supported.

Two PC boards reside on the carriage assembly:

- Carriage Sensor Driver Module (CSDM)
- Laser Driver Module (LDM)

The CSDM is responsible for the driver and sensor controls for the carriage servo drive and encoder. It also passes power and electronic signals from the DEC to the LDM. The LDM provides power and control for the laser diode.

Two more PC boards reside within the imagesetter. These boards provide driver/sensor control for the Media Transport system called the Sensor Driver Modules (SDM). The two boards are identical, with one controlling the supply side and the other controlling the take-up side.

The OCP PC board plugs directly into the back of the touch screen display. The OCP provides the electrical interface between the user and the DEC board to carry out commands input at the control panel.

2.3.2 System Architecture

The SPI bus in the Avantra architecture is organized so that only a single micro-controller can be a bus master at any one time, with the remaining controllers as slave devices. At power-up the DIAG micro-controller is configured as the master device. It initializes the whole system, performs some basic confidence checks, and then gives up its mastership role to the DEC K-1.

Communications between slave controllers must first go through the master micro-controller. Usually the DEC K-1 coordinates the inter-processor tasks in the system. For example, if the DEC K-1 is the master and the OCP wants service from the DSP, the OCP must first notify the DEC, which then passes the service request to the DSP. After the service is performed, the DSP sends the result to the DEC, which then forwards it to the OCP.

Each micro-controller performs specific tasks in the system. The main tasks performed by each micro-controller in the Avantra system are described next.

2.3.2.1 DIAG Micro-controller

- System initialization at reset
- Power-up tests
- System diagnostics
- Handling SPI communication primitives
- Loading correction tables
- Debugging monitor mode
- Monitoring SPI communications

2.3.2.2 DEC K-1 Micro-controller

- Diagnostic tests
- Handling SPI communication primitives
- Deriving carriage position information
- Driving media transport motors
- Monitoring sensor arrays
- Video modulation
- Spot/Polarizer and focus motors
- Saving/restoring EEPROM parameters
- Setting up/initializing imaging functions, including stop/start
- Motor/bridge support

2.3.2.3 DSP Micro-controller

- Diagnostic tests
- Handling SPI communication primitives
- Providing low pass filters
- Carriage servo velocity information
- Spinner servo loop
- Supplying servo loop

2.3.2.4 OCP Micro-controller

- Diagnostic tests
- Handling SPI communication primitives
- Providing APIS interface (i.e. start take, end take, status)
- Graphical user interface (setting customer parameters)
- On-line processor communication support
- System controller

2.3.2.5 DEC K-1 FLASHROM

- Main DEC software

2.3.2.6 DSP FLASHROM

- DSP main program
- Correction tables

2.3.2.7 OCP FLASHROM

- OCP main program
- Control panel icons

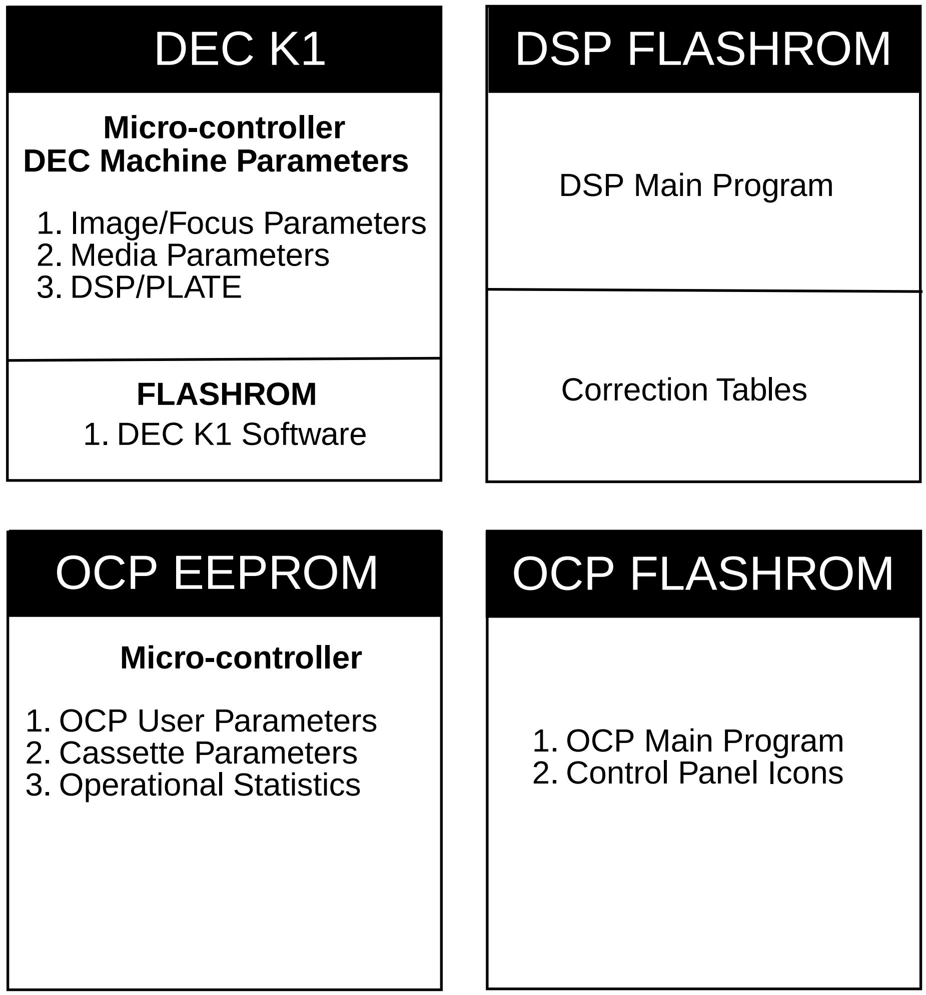


Figure 2-1 Avantra Micro-controller/FLASHROM map.

2.4 Digital Engine Controller (DEC)

The digital engine controller (DEC) reacts to high level commands sent by the operator control panel (OCP). With the OCP acting as the system master, the DEC directs the individual stepper motors, sensors, and/or DSP servo loops. Refer to the flowchart in Figure 2-2.

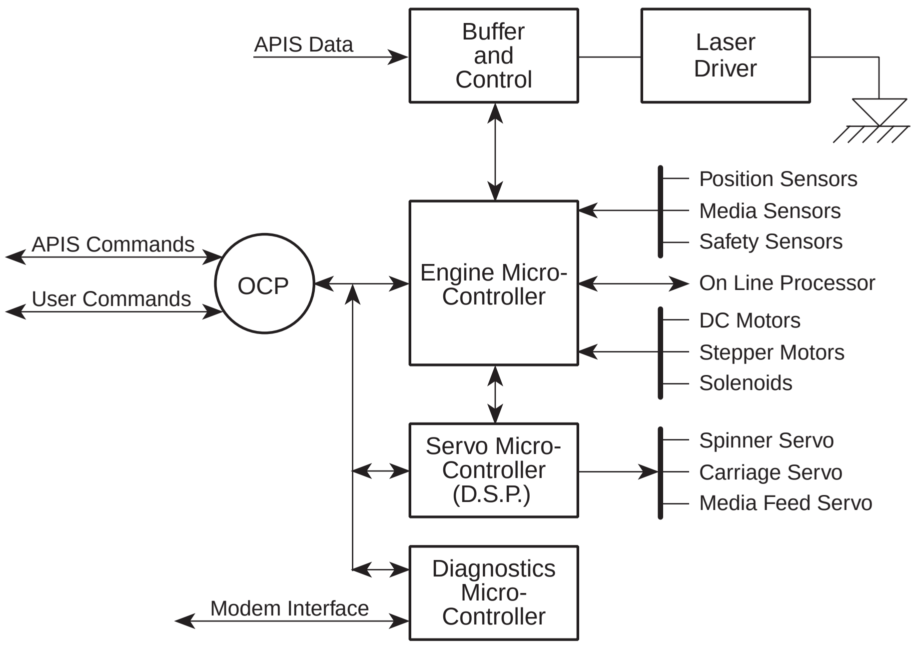


Figure 2-2 OCP to DEC to sensor/motor/servo flowchart.

Commands received at the DEC's u-controller direct operations to a code segment. The code segments can be a high level operation such as a supply cut. The code segments also can be smaller elements that combine to produce a higher operation.

Providing small command segments adds to the system flexibility in undefined volatile areas. Accessing only stable code reduces the likelihood of the DEC's u-controller program memory requiring updating, which has been the case in the media handling area. Updating program memory requires reprogramming the FLASHROM.

The DEC is subdivided into the following submodules:

- Synchronous serial interface (SPI)
- Image control
- Asynchronous serial interface (on-line processor)
- System sensor, 5 x 6 matrix submodule
- Driver selection

2.5 Operator Control Panel

The operator control panel module (OCP) is the system task master. The OCP, implemented with a micro-controller, gathers both APIS commands from a RIP and user commands from the keyboard. Commands are parsed and then either processed directly by the OCP module or sent along to the appropriate micro-controller for processing via the SPI communication link.

The OCP module consists of the following submodules and is shown in the OCP block diagram in Figure 2-3.

- 68HC11 Micro-controller
- Program/Display FLASHROM
- Liquid Crystal Display (LCD)
- Keypad Matrix
- OLP Serial Interface
- SPVAPIS Serial Interface
- Speakers (Audio Interface)

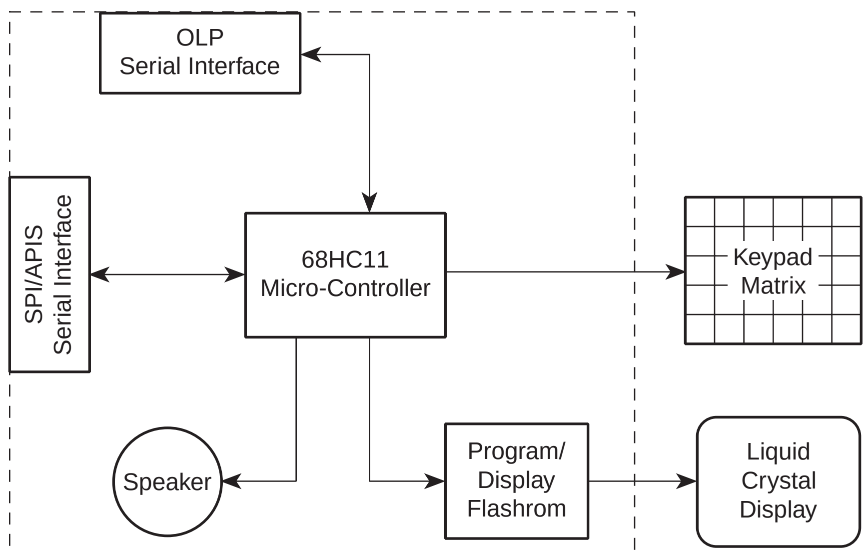


Figure 2-3 Operator control panel (OCP) block diagram.

2.5.1 Micro-controller

The OCP micro-controller is the main processing element in the OCP module.

2.5.2 OCP FLASHROM

The OCP FLASHROM contains the graphic display data for the control panel (i.e., icons) as well as the main OCP code. The OCP module uses a 2M. (512 x 8) version of this ROM. A serial communication link to a PC, which can be remote or on-site, can update the FLASHROM.

FLASHROMS, unlike UVPROMS, can be electrically erased and re-programmed. This eliminates the need of physically replacing the component. Erasure/re-programming of the FLASHROM is limited to 10,000 cycles.

The OCP micro-controller reads the program directly from the FLASHROM via one of its I/O ports. The display portion of the ROM can also be read by the micro-controller and fed directly into the Liquid Crystal Display interface.

2.5.3 Liquid Crystal Display (LCD)

The display used on the Avantra is a 320 x 240 bit LCD. The display includes a character generator for a 6 x 12 bit character as well as a graphical interface for the icons stored in FLASHROM. The LCD connects to the OCP module via a 20-pin flex cable.

The viewing angle of the LCD is user adjustable under software control. An 8-bit word is written to a DAC which is proportional to the LCD's optimum viewing angle.

2.5.4 Keypad

The keypad is set up in a 6 x 5 matrix of rows and columns. A key stroke is determined by clearing a column signal and reading the row to determine the active key stroke

2.5.5 OLP/Bridge Interface

Refer to Section IV: On-line Processor.

2.5.6 Speaker (Audio Interface)

The OCP module includes a beeper/speaker. The beeper/speaker connects to a port on the OCP micro-controller and can be activated under software control.

2.6 Carriage Sensor Driver Module (CSDM)

The CSDM is a PC Board that connects the carriage and all its associated electrical devices to a common location on the moving carriage. The CSDM is located in the interior part of the system and mounts on the moving carriage. The CSDM provides an interface to the DEC through a Flex-Band Cable, connecting all the devices and local drivers on the carriage directly to the DEC. The CSDM contains:

- Power lines back to the DEC board
- Carriage drive DC servo motor/encoder
- Spot changer/polarizer stepper motor
- Spinner motor DC servo motor/encoder
- Carriage digital motor/encoder
- Focus changer stepper motor
- Spot changer home sensor
- Polarizer home sensor
- Focus home sensor

The Laser Diode Drive, (LDD), connects to the CSDM. All controlling signals pass from the DEC, through the Flex-Band, and through the CSDM to the LDD. Also see Figure 2-4.

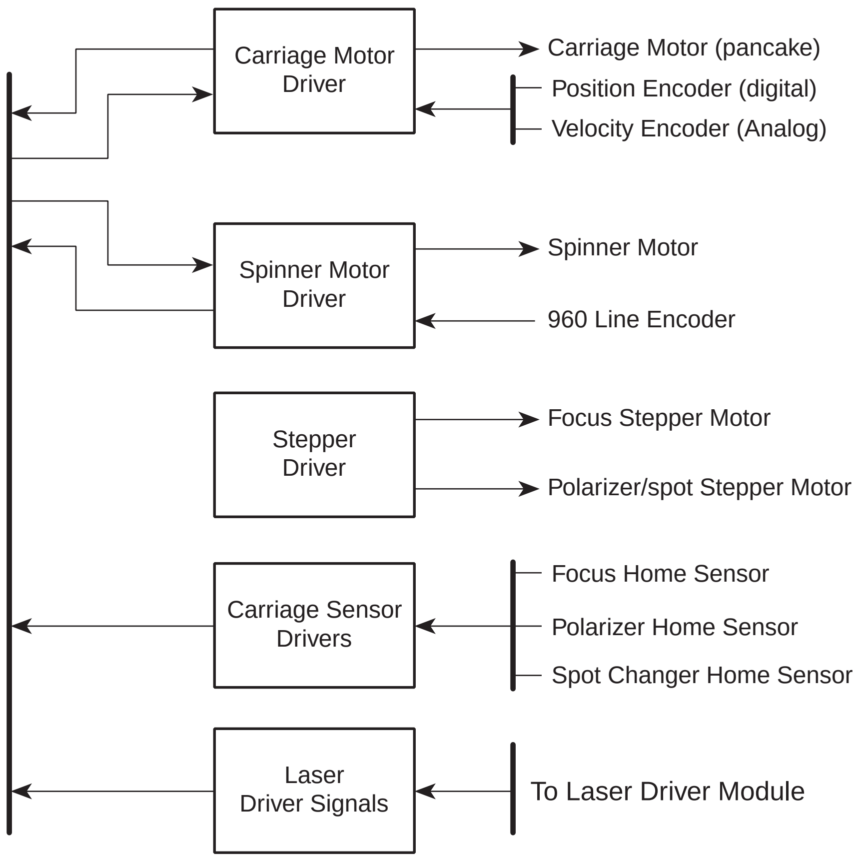


Figure 2-4 Carriage sensor driver module (CSDM) block diagram.

2.7 Sensor Driver Module (SDM)

The SDM PC board provides motor driver and sensor control for the media transport system. Two identical SDMs are located in the system. Although referred to as the supply sensor driver module (SSDM) and the take-up sensor drive module (TSDM), they sometimes control functions on the opposite side of the system. Refer to the SSDM and TSDM interconnect illustrations for the functions they support.

The SDMs perform several functions for the Media Transport system:

- Provides a direct connection to the DEC through a ribbon cable, and provides power and control of reads and writes of all devices connected to the SDMs.
- Provides the necessary drive for all the media transport motors and solenoids.

- Connects directly to all sensors (except several that connect to the CSDM) and gathers them into matrices of 2 x 6. This allows for a simpler and more orderly system cabling scheme.

2.7.1 SDM to DEC Interface

Each SDM has one header connection from the DEC, providing power and two 8-bit data lines for reading sensors and controlling motors. The control signals for the servo motors also pass through this header to the appropriate servo motor.

2.7.1.1 Motor Drives

The SDM has three basic types of motor drivers:

- Stepper
- DC motor/solenoid
- Servo

2.7.1.2 Sensors

Each SDM supports twelve sensors configured in a 2 x 6 matrix. The matrix is read directly by an 8-bit data port through a RS-423 type driver pair to the DEC. The sensor matrix is similar to that of a keypad design where each sensor has a row and column location (address) on a grid (refer to Figure 2-5). A sensor is determined to be active by addressing a column within the grid and reading the row for an active sensor condition.

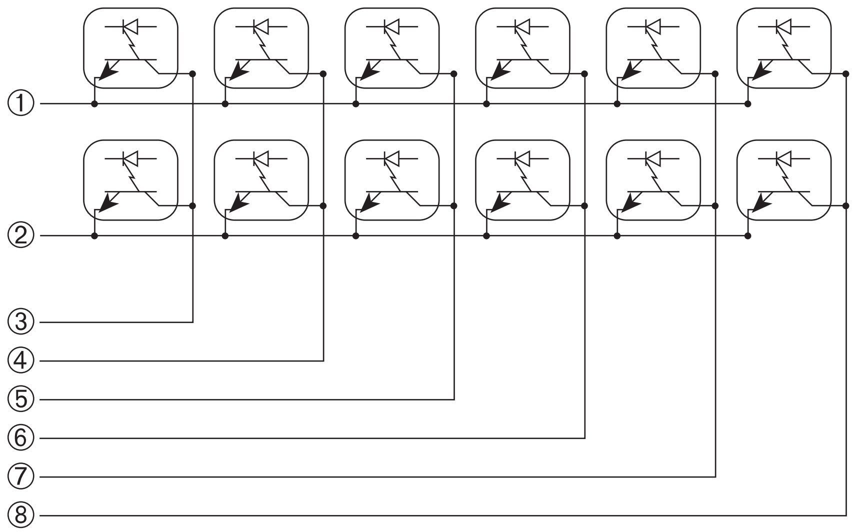


Figure 2-5 Sensor grid.

①–Row 0. ②–Row 1. ③–Column 0. ④–Column 1.
⑤–Column 2. ⑥–Column 3. ⑦–Column 4. ⑧–Column 5.

2.8 Laser Driver Module (LDM)

The LDM controls the laser diode current so that the laser diode light output waveform corresponds to that of the clocked data from the image buffer. The light output intensity on an image basis is programmable via the control panel by varying the laser diode power and polarizer setting.

Laser diode output light intensity variations due to variations in laser cavity temperature are reduced by the use of wideband active feedback. This feedback loop compares the laser diode photodiode current with a reference current. In order to keep the loop disturbance to a minimum when the laser diode is turned off, a current steering type feedback loop is used. The laser diode is turned off by steering the loop current into a dummy laser, which keeps the loop active.

A dip switch mounted on the LDM calibrates the effect of the laser diode photodiode sensitivity variations from unit to unit. The LDM PCB is not a field replaceable unit. The Laser Diode Module Assembly, which includes the LDM PCB, is not field replaceable due to the extremely tight mechanical tolerances.

2.9 Power Supply

The power supply is a low voltage switching supply, with non-adjustable outputs. A switch mounted to the side of the power supply configures the input voltages of 110 or 220 volts. The 300 watt power supply generates the following voltages:

+ 5.0 volts	20.0 amps
+24.0 volts	8.0 amps
+12.0 volts	1.0 amp
-12.0 volts	1.5 amps

2.9.1 Additional Voltages

Two other voltages necessary to the system are generated locally with converters on the DEC PCB:

- 5.2 V

9.0 V

The -5.2 volts derives from -12.0 volts, which is used for the ECL logic on the DEC. The +9.0 volts derives from the +12.0 volts and is used to supply power to the diagnostic modem.

2.9.2 Power Distribution

A discrete wiring harness provides power from the power supply to the DEC PCB. The signal cabling supplies power for isolated boards within the system. This harness will be included with the power supply as a complete field replaceable unit.

2.9.3 Power Good

The power supply generates a “power good” signal, which is used as a reset within the system. This signal goes “true” when all supplies are within regulation specification. The signal goes “false” at least 2 ms. prior to any of the supplies going out of regulation. This gives the DEC and OCP enough time to save any non-volatile parameters that may have changed since the last power-up cycle.

CAUTION: An internal fuse is located in the power supply, but it is not necessary to check or replace it. If the fuse should burn out, consider the power supply as the cause.

2.10 Optical System Overview

The optical system divides into two basic sections:

- Spot generation module (SGM)
- Spin motor module

Several components, which all locate on a sub-base that mounts on the carriage assembly, make up the SGM. The spin motor module also directly mounts to the carriage assembly, which translates through the center of the drum.

A laser diode generates a modulated beam of red light under the control of the laser diode driver electronics. This beam attenuates in a polarizer; one of four apertures resizes and shapes the beam. Next, the weak lens/spot forming lens re-focuses the beam to a small imaging spot. The spin mirror on the shaft of the spin motor re-directs the beam 95 degrees away from the spin axis and sweeps the imaging spot in a circular motion as the motor rotates at high speeds. As the imaging spot sweeps across the inside of the drum, the entire optical system is traversed through the center of the drum by the carriage assembly, writing onto the media the information used to modulate the laser.

Figure 2-6 illustrates the optical schematic for the Avantra.

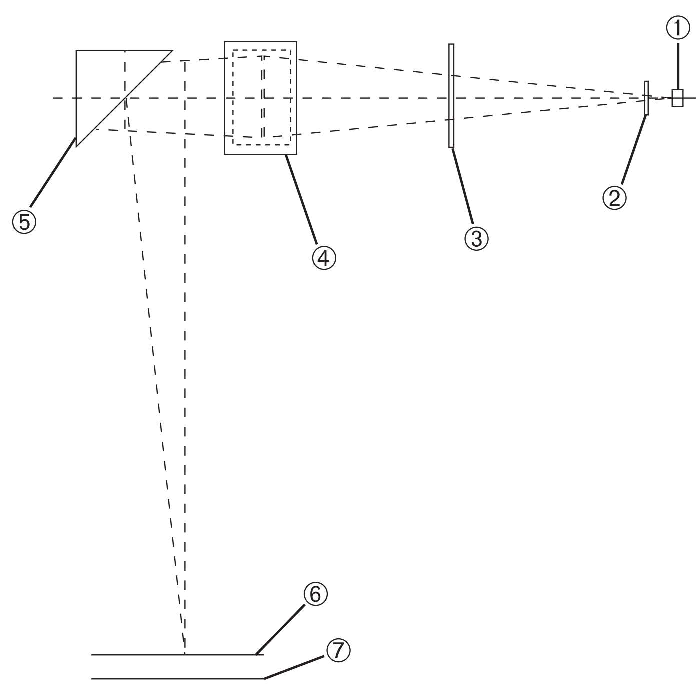


Figure 2-6 Avantra optical schematic.

①–Laser diode. ②–Polarizer. ③–Aperature. ④–Spot forming lens.
⑤–Spin motor mirror. ⑥–Image plane (film). ⑦–Drum surface.

2.11 Spot Generation Module

The Spot Generation Module (SGM) is a field replaceable unit that mounts to the carriage assembly. Figure 2-7 illustrates the SGM. The SGM produces a focused laser spot of the proper size, shape and position.

The SGM consists of a base on which the following mount:

- Laser diode module
- Polarizer/sensor
- Spot size changer/sensor
- Spot forming lens
- Weak/focus lens/sensor
- Beam compression motor/sensor

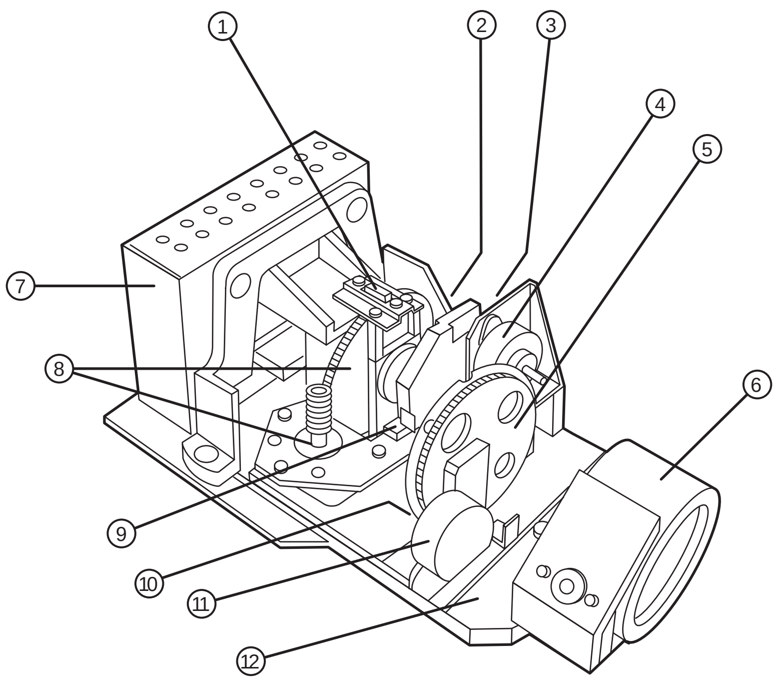


Figure 2-7 Spot generation module.

①–Polarizer sensor. ②–Beam compressor motor.
③–Beam compression sensor. ④–Weak lens motor.
⑤–Spot size changer. ⑥–Spot forming lens. ⑦–Laser diode mount .
⑧–Polarizer wheel and motor. ⑨–Focus sensor. ⑩–Spot size sensor.
11–Aperture wheel motor. 12–SGM base.

The following sections describe each of these submodules in detail.

2.11.1 Laser Diode Mount

The laser diode mount provides the mechanical interface to mount the laser diode driver module PCB, as well as the laser diodes. Refer to Figure 2-7. This submodule also provides precision x and y translations for module-level bow corrections, an angle reference in the z direction of the laser diode for beam ellipticity, and adjustment in the y direction for beam pointing.

This component is factory adjusted and is not field replaceable or adjustable. If the laser diode should fail, the entire SGM must be replaced.

NOTE: The Laser Diode Driver PCB is not field replaceable.

2.11.2 Polarizer

The polarizer consists of a polarized lens. A stepper motor rotates the laser beam path to provide static control of output beam power. Refer to Figure 2-7. The polarizer corrects for addressabilty changes and provides additional static exposure control.

A thin plate of special glass, which internally absorbs light polarized in one direction, makes up the polarizer. Since the light leaving the laser itself is polarized, rotation of the plate changes the amount of light absorbed in the glass. A home position hole passes through an optical sensor to signal that the polarizer is at the home position. The polarizer motor and sensor are field replaceable.

2.11.3 Spot Size Changer

The spot size changer consists of an aperture wheel that is rotated in the laser beams path by a stepper motor. The changer alters the size of the focused spot at each addressability. Refer to Figure 2-7. The aperture truncates the beam to produce the correct size spot for each addressability. The aperture also controls the shape of the focused, eliptical spot.

The aperture wheel has four (4) different size apertures, one for each addressability. The largest aperture is used for 3600 DPI and the smallest for 1200 DPI. Four cutouts on the edge of the aperture wheel pass through a sensor to position the aperture to the correct spot size. One cutout, which is different from the other three, signals that the aperture is at home position (3600 DPI). The aperture motor and sensor are field replaceable.

2.11.4 Spot Forming Lens

The spot forming lens refocuses the beam to a small imaging spot on the drum surface. Refer to Figure 2-7. The lens is the final focusing element in the optical system and consists of a focus lens and mount that directly attach to the SGM base. This component is factory adjusted and is not field replaceable or adjustable.

2.11.5 Weak Lens

The weak lens, which is a long focal length lens, moves along the optical axis of the SGM to provide for a system level focus adjustment. It mounts between the polarizer and the spot forming lens. A small motor and screw mechanism translates the lens to provide the proper focal length over the entire range of media thicknesses (4 - 12 mils) as well as a system level fine focus adjustment. A motion of 20 mils. of this lens shifts system focus by approximately 1 mil.

Every system has the weak lens mechanical components installed. They provide for the system level focus adjustment. The software to automatically adjust focus for different media thicknesses is optional.

2.11.6 Beam Compressor

The beam compressor mechanisms consist of a lens, sensor, and motor. The lens is moved in front of the laser diode only at 1200 DPI. This occurs because of the larger dot (20 microns), which requires more laser output at 1200 DPI.

2.12 Spin Motor Module

The spin motor module is a field replaceable unit that mounts to the carriage assembly. The spin motor module provides the high-speed deflection of the focused laser spot along the curved inside circumference of the image plane (drum).

The module consists of a high-speed spin motor on which a mirror and encoder are mounted and balanced. Figure 2-8 illustrates the spin motor module.

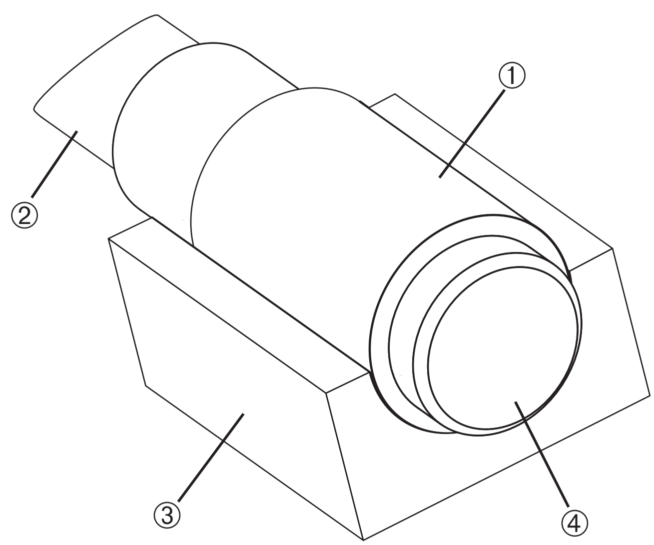


Figure 2-8 Spin motor module.

①–Spin motor. ②–Mirror. ③–Spin motor mount. ④–Encoder.

2.12.1 Spin Motor

The spin motor is a precision hydrostatic (air bearing) spindle DC servo motor. Refer to Figure 2-8. It runs at a constant velocity of 13,500 RPMs for Avantra 36/44 systems and 20,000 RPMs for Avantra 36S/44S systems.

2.12.2 Mirror

The 42.5 degree spin mirror deflector attaches directly to one end of the spin motor shaft. Refer to Figure 2-8. The mirror reflects the converging beam from the spot generation module 95.0 degrees away from the spin axis, and sweeps the focused spot around the internal circumference of the drum, exposing the media.

2.12.3 Encoder

The encoder is a 1000 line rotary type encoder, balanced and attached to the opposite end of the motor shaft. Refer to Figure 2-8. The encoder is the master clock source for the fast scan modulation of the laser diode, as well as the master clock for the slow scan carriage drive. Both clocks operate through Phase Lock Loop (PLL) systems to average the noise and errors in the encoder disk. The encoder also has a once/rev or index sensor used to synchronize all of the opto/mechanical components. This signal generates the Beginning of Line (BOL) signal.

2.13 Linear Carriage Transport Overview

The linear carriage transport components support the optical system, as well as provide the precise translation of the optical system along the axis of the internal drum.

The major components are:

- Carriage assembly
- Linear bearing guideway
- Carriage home position sensor

2.13.1 Carriage Assembly

The carriage assembly, which is a field replaceable unit, traverses through the center of the drum on rails. The carriage assembly supports and translates the optical system through the internal drum. Figure 2-9 illustrates the carriage assembly.

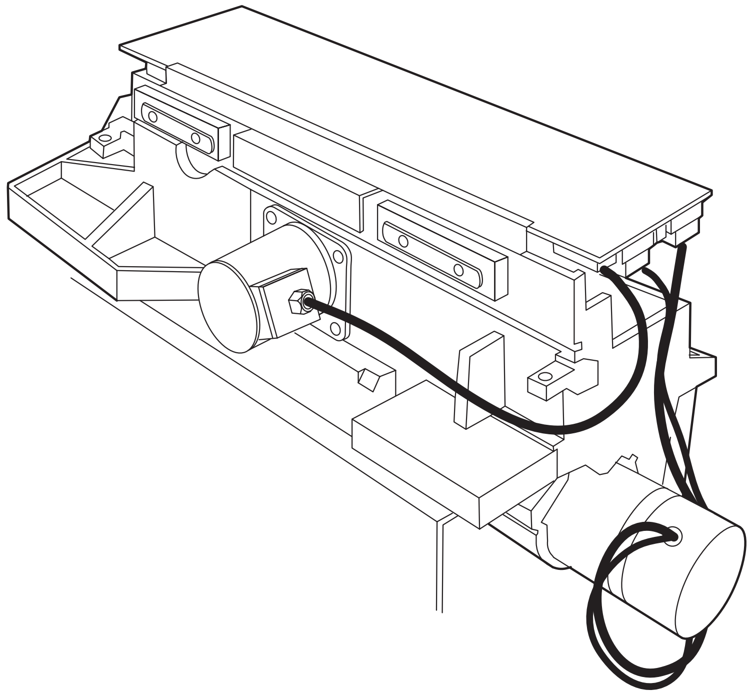


Figure 2-9 Carriage assembly.

The carriage assembly consists of:

- Carriage housing with precision mounting interfaces for the bearing components
- Optical system
- Friction wheel drive components

The carriage assembly uses a friction drive system with recirculating ball bearings that ride on two rails mounted to the upper structure. This type of system makes the carriage self contained.

2.13.1.1 Friction Wheel Drive Subsystem

The friction wheel drive subsystem consists of:

- Spin motor assembly
- Flywheel
- The digital and analog encoders
- Active preload system

The precision ball bearings in the carriage housing support the shaft; the friction wheel rides along one of the fixed rails (guide rail) of the linear bearing guideway system. Friction contact is maintained between the wheel and the guide rail because of the gravity load of the carriage and an active preload element.

Both encoders are high count precision rotary encoders. One of the encoders (analog) couples directly to the friction wheel shaft and is used to feed back carriage velocity errors. The other encoder (digital) mounts inside the carriage housing and is preloaded to make direct contact with the guide rail. This encoder feeds back carriage position errors. The carriage electronics, which make small adjustments in torque to the servo motor to ensure proper carriage position and velocity at all times, process both velocity and position error signals.

2.13.2 Linear Bearing Guideway

The linear bearing guideway system consists of two (2) recirculating ball bearing units. These units each mount to one side of the carriage housing. The housing rides in a fixed V-groove rail mounted to the upper structure. The friction wheel extends from the opposite side of the carriage housing, which rides on a flat rail mounted to a parallel surface on the upper structure.

2.13.3 Carriage Home Position Sensor

A carriage home position sensor (optical) establishes a calibration position for the carriage. The calibration position establishes a reference point to start imaging.

2.13.4 Inner Shrouds

The inner shrouds, used for guiding media during feed sequences, mount directly to the carriage assembly and travel with the assembly through the drum. Refer to Figure 2-10. The shrouds also reduce noise and prevent media fogging.

Two inner shrouds attach to the center of the carriage mount. Each shroud has three sets of brushes and one outrigger. Four screws attach the shrouds to the mount. Both shrouds can only be removed from the left side of the imagesetter; i.e., to remove the right inner shroud, you must first remove the one on the left.

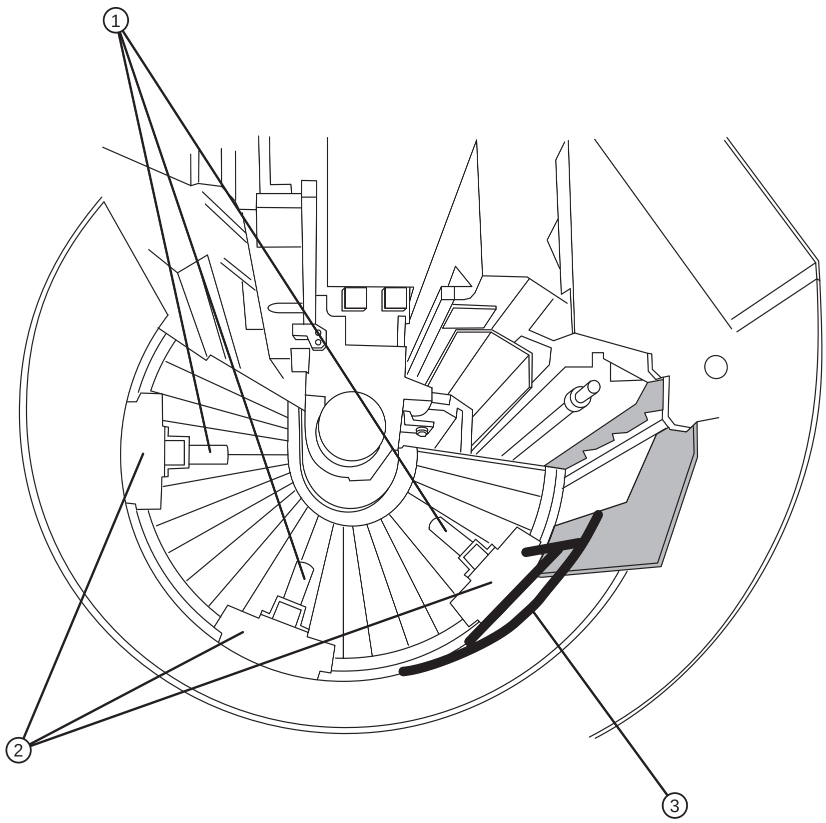


Figure 2-10 Inner shroud.

①–Solenoids. ②–Brushes. ③–Outrigger.

2.13.4.1 Outriggers

An outrigger attaches to each inner shroud. The outriggers prevent smaller sized media from curling during a load.

2.13.4.2 Brushes

Three sets of brushes attach to each inner shroud. An individual solenoid controls each brush. During imaging and certain feed sequences, the brushes position either up or down. Brush control is determined by the values loaded in the DEC Image/Focus/Bridge Menu for film, paper and plate material.

NOTE: On the Avantra 36/44 the drivers for the brushes are on the SDM board. On the 36S/44S the brushes are on the carriage board

2.13.4.3 Flappers

Because the shrouds are not as wide as the drum, the system requires two flappers to hold the media against the drum. The flappers assist the media through the take-up side during the loading process.

During the loading sequence, the media stops feeding at a point a few inches short of the take-up punch. The two flappers come down and hold the media against the drum. This is called the flappers' load position. Once the flappers are in place, the loading sequence moves the media through the take-up side.

After the loading sequence is complete, the flappers go up, which is called their image position. A stepper motor and two sensors control each flapper. The sensors tell the system when the flappers are in their load (down) or image (up) positions.

2.13.5 Vacuum System

The Avantra 36/44 has a multi-port vacuum system. The system contains a 115 volt vacuum pump, transformer, vacuum board, vacuum valves and voltage sensor relay. The following describes each component.

2.13.5.1 Vacuum Pump

The pump removes the air between the drum and the media. The vacuum remains off only during media movements. Refer to Figure 2-11.

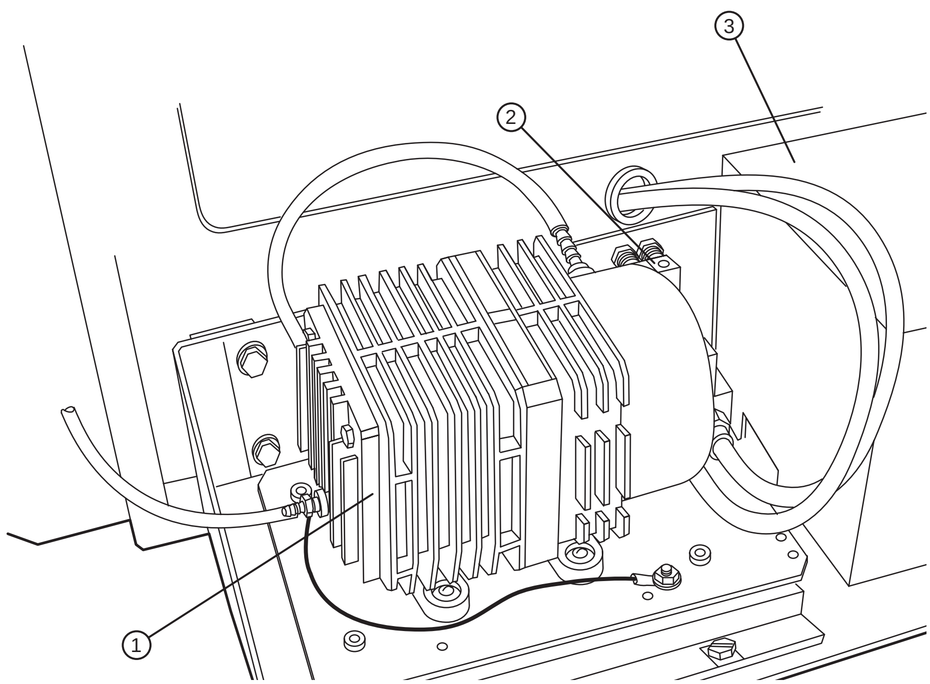


Figure 2-11 The vacuum pump.

①–Vacuum pump. ②–Valves. ③–Electronics box.

2.13.5.2 Vacuum Valves

The pump vacuum lines attach to valves, which are controlled by the system software in accordance with the width of the media. Any width below 26 inches causes one of the valves to open. Any width over 26 inches causes both valves to open.

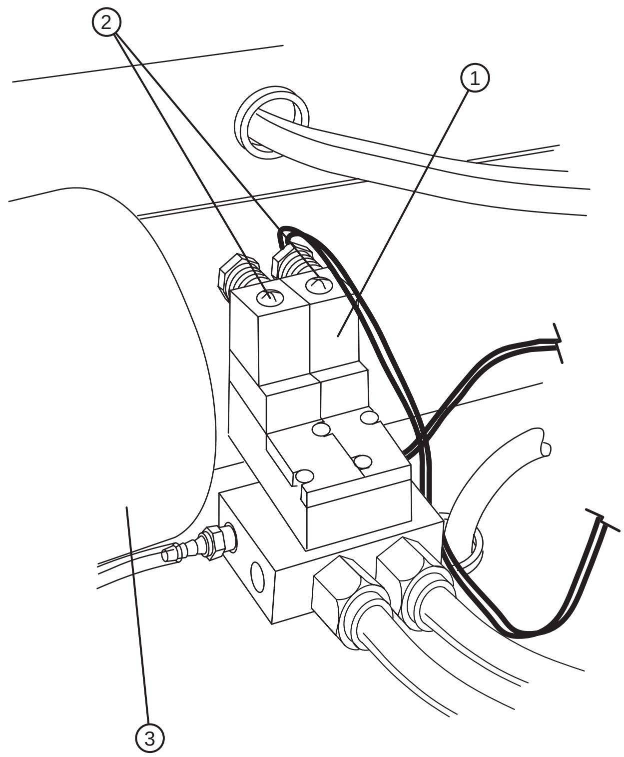


Figure 2-12 The vacuum valves.

①–Two valves. ②–Indicators. ③–Vacuum pump.

2.13.5.3 Vacuum Board

The vacuum board controls the vacuum pump and the vacuum valves. Refer to Figure 2-12. On/off information for the pump and valves comes to the vacuum board via the DEC board.

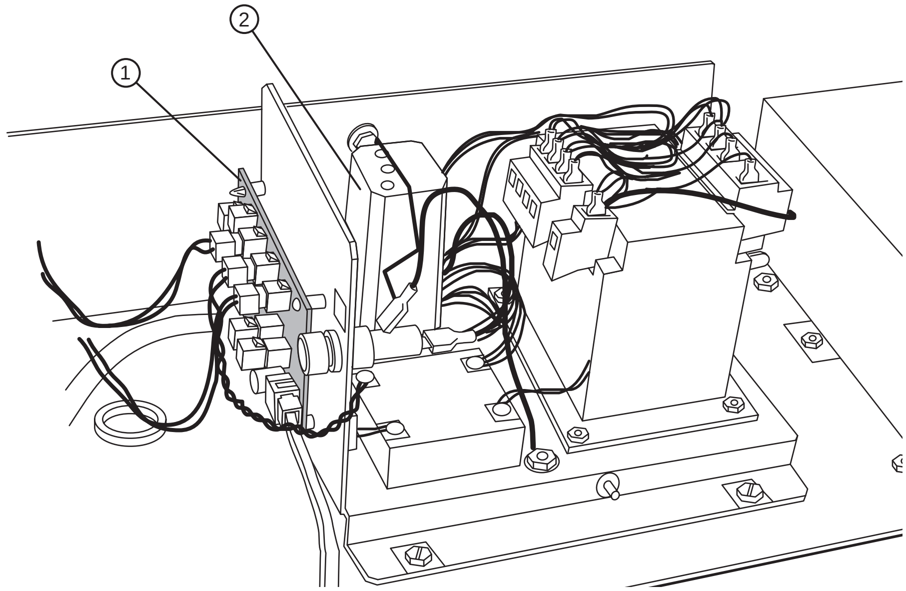


Figure 2-13 The vacuum board and sensor relay.

①–Vacuum board. ②–Sensor relay.

2.13.5.4 Vacuum Voltage Sensor Relay

This relay senses the voltage when powering on the imagesetter. Refer to Figure 2-13.

If the relay senses 220 volts, it configures the transformer for a 115 volt output to the vacuum pump. The green light on top of the relay sensor should come on at 220 volts. If the light is off, then 220 volts can be output to the vacuum pump.

2.14 Media Transport System Overview

The media transport system automatically loads, punches, advances, cuts, and rewinds media from multiple supply sources into and out of the drum image area. This process entails pulling media out of the supply cassette, applying it to the drum, firmly affixing the media to the drum, and, after imaging, pushing media into the take-up cassette or on-line bridge.

The media transport system consists of:

- Rollers and drives
- Supply and take-up supports
- Autocutter
- Optional punches/clamps

The system also consists of all hardware necessary to advance and retract the media from the supply cassettes through the drum and into the take-up cassette.

The media transport system handles:

- Web fed form
- Red sensitive paper
- Film
- Plate

The media feeds through the transport system by means of a nip and one of two rollers on the supply side (one for each supply cassette). The nip and roller push the media through an entrance platen into the supply punch module then down onto the drum surface. The inner sleeves, mounted to the carriage assembly and aligned concentric to the drum, provide an external surface that forms a tunnel to confine the media during the feed operation. The feed continues to rotate the drum. The media travels through the take-up punch module until it reaches the open take-up nip rollers. The take-up nip rollers close and start pulling the media. The supply motor drives approximately 5% faster in torque mode to keep the media compressed firmly against the drum surface.

2.14.1 Supply Side Mechanics

The supply side mechanics consist of the following components:

- Supply drive DC gear motor with encoder for loading/unloading media
- Two DC gear motors for rewinding media into the supply cassettes
- DC gear motor for A/B spindle selection
- Three drive rollers for loading and unloading media
- Two spindle sensors
- Supply jam sensor
- Supply media present sensor

The following sections describe each of these submodules in detail.

2.14.1.1 Supply Drive DC Gear Motor with Encoder

This motor loads and unloads media into the system from either spindle A or spindle B. The motor drives in one direction to load media from spindle A and in the reverse direction to load media from spindle B.

2.14.1.2 DC Rewind Motors

This motor rewinds the media back into the supply cassette. They are also used as forward assist motors to help the supply motor during loads and media feeds. The system has two separate motors, one for each supply cassette.

2.14.1.3 DC Spindle A/B Gear Motor

This motor nips the center (drive roller) to the top (spindle A) roller or bottom (spindle B) roller.

2.14.1.4 Drive Rollers

The drive rollers load and unload media from either spindle A or B. They are nipped by the spindle A/B gear motor, which is controlled by the spindle A/B sensors.

2.14.1.5 Spindle A/B Sensors

These two sensors shut off the spindle A/B gear motor when the drive roller is nipped to either A/B drive roller.

2.14.1.6 Supply Jam Sensor

The supply jam sensor detects media jams on the supply side. During media movement, a wheel inside the sensor assembly moves and generates an output. If the wheel doesn't move, a jam is reported to the control panel.

2.14.1.7 Supply Media Present Sensor

This sensor, which is located in the jam sensor assembly, informs the system when media is loaded into the system. When the edge of the media passes the sensor during a rewind, the sensor stops the supply drive and supply cassette rewind motors.

2.14.2 Powered Media Take-up Cassette

The powered take-up cassette consists of a molded cassette body and cover, a counter-weight core assembly, a retractable entrance chute, and a latch mechanism (see Figure 2-14). The take-up cassette has a 100 foot capacity (4.5 mil media) for the Avantra. This cassette will not work with 12 mil plate. Twelve mil plate must be output through the bridge and OLP.

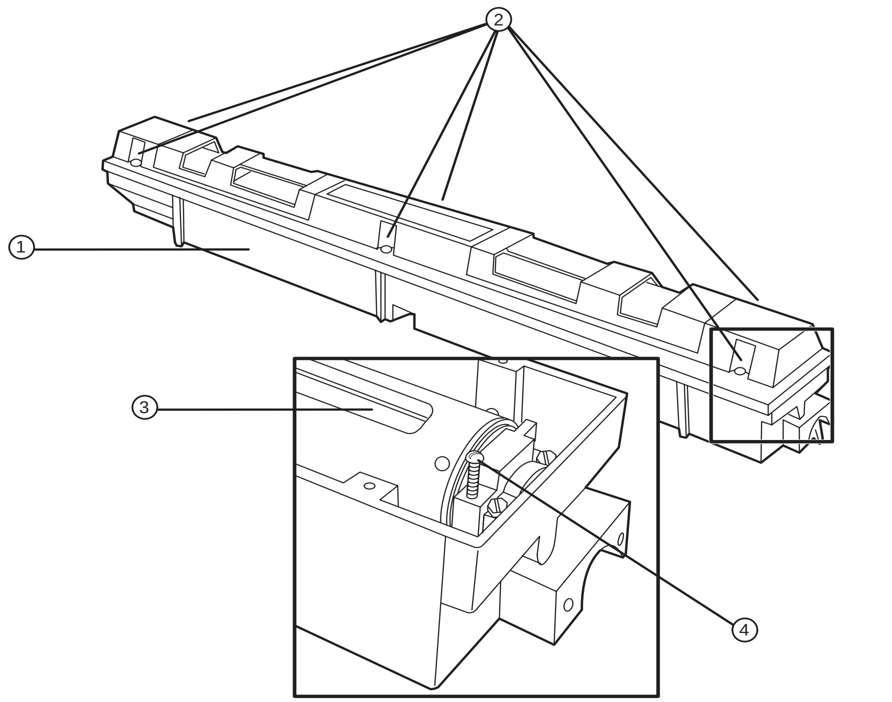


Figure 2-14 Take-up cassette.

①–Take-up cassette. ②–Six cover screws. ③–Core. ④–Clutch adjustment screw.

In order to accept media, the core is driven enough to open the counter-weight gap. A reflective optical sensor is located in the take-up area. This sensor operates during the drive sequence and signals the exact point that aligns the core gap to the entrance chute.

The core is driven by an attached friction wheel, which is engaged against a spring-loaded, electrically interlocked DC gear motor that resides on the take-up platform. Reflective tape, which attaches to the bottom of the take-up cassette, covers a sensor on the take-up platform when the cassette is installed into the system. This informs the system when a take-up cassette is in position for system operation.

2.14.3 Media Punch/Clamp Assembly

The media punch makes registration holes in the media. Refer to Figure 2-15.

The punch assembly achieves high accuracy by punching the media within the imaging drum, then imaging the media without any intervening media movement. The head punch assembly is located on the top (take-up side) of the page. The tail punch assembly is located at the bottom (supply side). These two punch assemblies are individually selectable for activation from the operator's control panel.

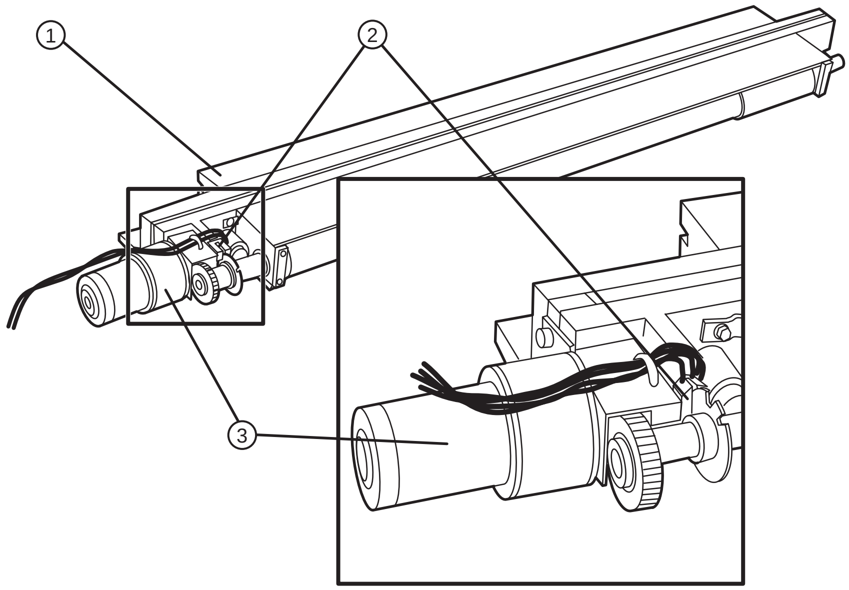


Figure 2-15 Media punch/clamp assembly.

①–Punch assembly. ②–Sensor. ③–Punch assembly motor.

All punches operate the same way. A gear motor turns a shaft that actuates a pressure plate (clamp) and a rocker mechanism. The rocker assures punch engagement regardless of punch location. Optical switches indicate positions for home, clamp and punch. All punched holes are completed with a single actuation of the punch assembly.

2.14.4 Take-up Drive Assembly

The take-up drive assembly applies the appropriate pressure to the take-up drive rollers and pushes the media into a take-up cassette or into an on-line bridge.

The take-up drive assembly consists of two identical drive housings, one called the outer nip drive system and the other called the inner nip drive system. Both nip systems contain a pair of gear driven rollers, each with a center rubber section. The roller nip pressure is fixed by a pair of steel drive disks, one located at each end of the drive rollers.

2.14.4.1 Inner Nip Drive System

The inner nip drive system contains the take-up jam sensor and the servo motor/encoder, which changes the speeds of the take-up drive assemby. Refer to Figure 2-16.

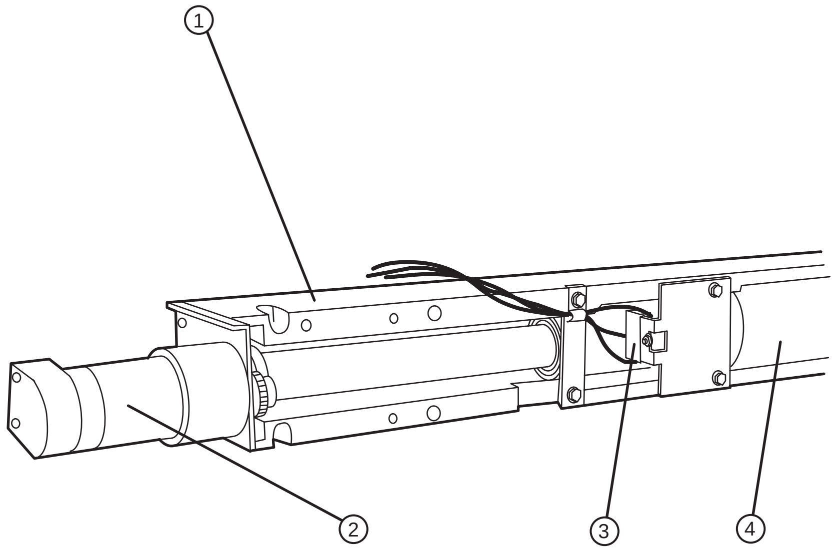


Figure 2-16 Inner nip drive system.

①–Inner nip drive system. ②–Inner nip motor. ③–Sensor. ④–Roller.

2.14.4.2 Outer Nip Drive System

The outer nip drive system contains the cutter interlock switch, which, when disabled, shuts off the cutter. Refer to Figure 2-17.

The outer nip releases the pressure between the rollers to allow media to pass through on an initial media load. The nip release mechanism helps media settle back onto the drum after normal image feeds and clearing jams.

Two continuous duty, DC, pull type solenoid mechanisms attached to the outside drive housing perform the take-up nip release function. Refer to Figure 2-17.

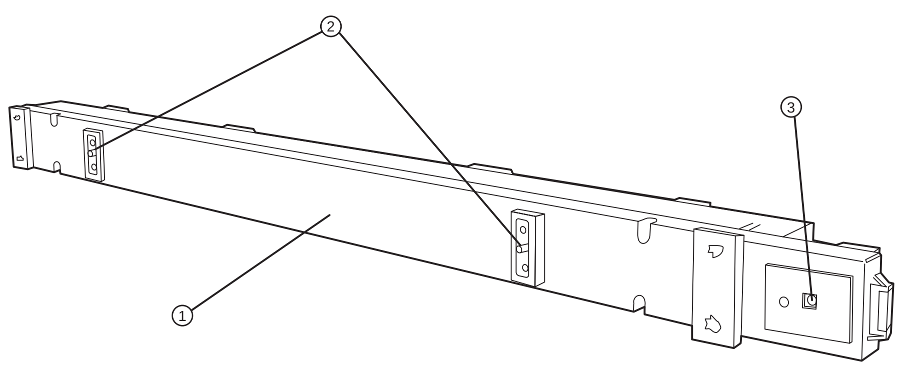


Figure 2-17 Outer nip drive system.

①–Outer nip drive system. ②–Two solenoids. ③–Cutter interlock switch.

The solenoid plunger attaches around the drive roller via a bushing arm. To open (release) the take-up rollers, the solenoids are energized for a pre-determined number of seconds. The solenoid stroke opens a .02" gap between the rollers to disengage the take-up drive, but not enough to disengage the drive gear mesh.

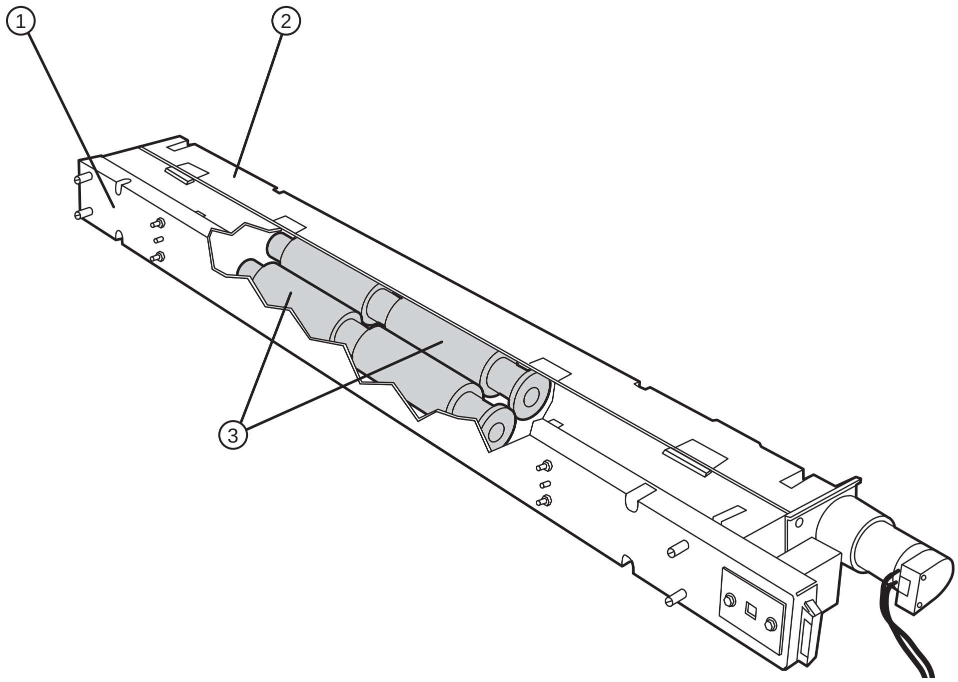


Figure 2-18 The take-up drive assembly.

①–Outer nip drive system. ②–Inner nip drive system. ③–Aligned rollers.

2.14.5 Media Cutter Assembly

An automatic media cutter is provided on the output side of the drum. See Figure 2-19. The cutter cuts all required media types, including the optional 8 and 12 mil thick film/plate material. The media cutter assembly is replaced as a complete unit.

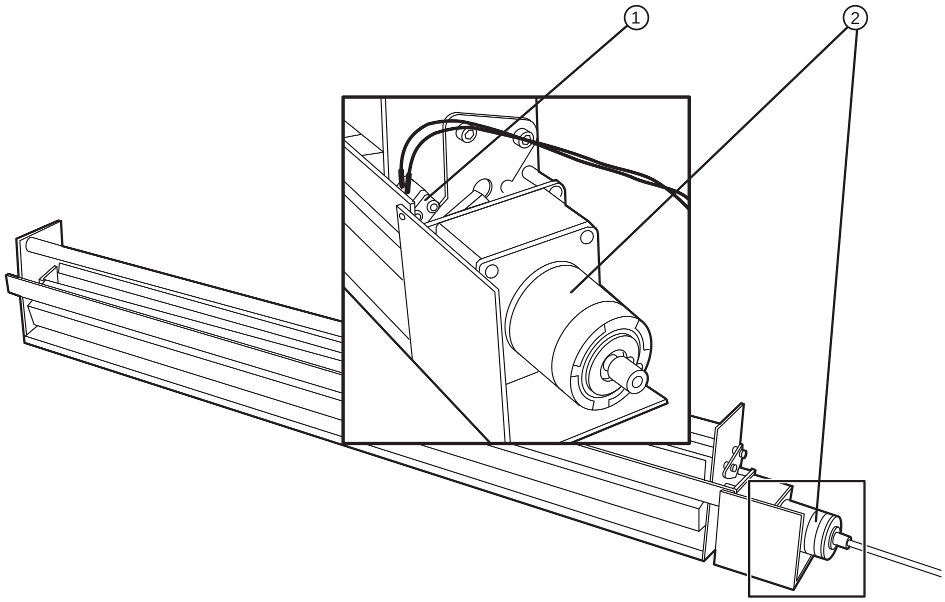


Figure 2-19 Media cutter assembly.

①–Cutter home switch. ②–Cutter motor.

NOTE: The DC gear motor and the home switch can also be replaced separately.

The cutter assembly consists of:

- Media platens
- Cutter bar
- Home switch
- DC gear motor
- Linkage
- Take-up media present sensor

Internal platens guide the media through the reciprocating cutter mechanism. A DC gear motor, which attaches to the end of the cutter through linkage, drives the cutter. One revolution of the motor output shaft causes the linkage to reciprocate the cutting bar. A built-in sensor (a mechanical-micro switch) signals when the cutting cycle completes. The media cutter assembly also includes the take-up media present sensor.

2.14.6 Supply Cassette

The supply cassette is a daylight loadable cassette that accommodates a 250 foot roll of 4 mil media in widths ranging from 16 to 36 inches. The cassette may be adjusted continuously between these widths.

The supply cassette consists of:

- Cassette housing
- Tension roller
- Two hub and spindle assemblies

Refer to Figure 2-20.

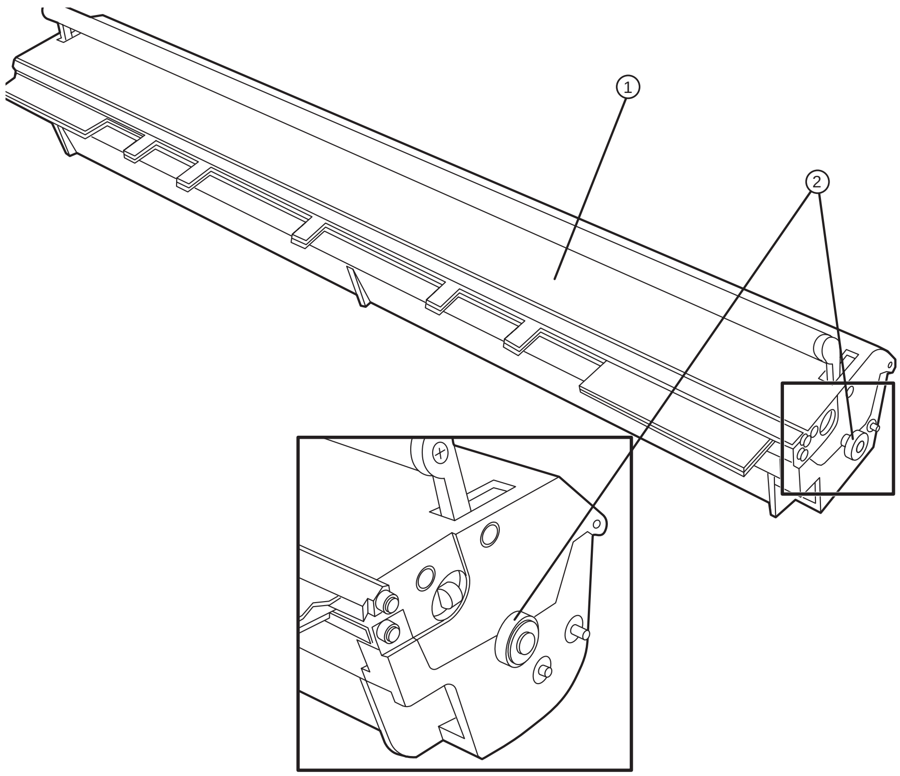


Figure 2-20 Supply cassette.

①–Supply cassette. ②–Spindle bearing.

The cassette housing opens in the center to facilitate the loading of media. The tension roller mounts on the upper half of the housing and keeps the media tightly wrapped on its core, while the media is either being pulled out or rewound.

Two hub and spindle assemblies, one placed at each end of the cassette housing, provide support for the media roll and the necessary user width adjustment. Machined grooves every inch on the spindles provide a detent position for the hubs to accurately and repeatedly locate the media roll in the cassette. One of the hub and spindle assemblies has a gear located at the end, which when loaded into the system, engages the supply cassette motor and gear to facilitate the rewinding of the media from the drum back onto the media core. This eliminates unnecessary media waste when unloading and changing to an alternate supply cassette.

2.15 Humidifier Option Overview

This section describes the mechanical, electrical and software characteristics for a field installable humidifier sub-system.

2.15.1 General Description

The humidifier creates a 50% (±5%) relative humidity in the drum 15 minutes after the humidifier is turned on. The system maintains an ambient range of 45% to 55% humidity while remaining within the imagesetter's operating temperature range. The humidifie unit installs within the imagesetter; the replenishment water supply mounts on the outside of the imagesetter for ease of access.

The following sub-assemblies make up the humidifier system:

- Humidifier sub-assembly
  - Module sub-assembly
  - Water supply)
- Electronics module (board)
  - Float switch/water valve solenoid
  - Fan control circuit
- Interface connections
  - Switched +24 volt driver
  - Fan speed selector

The following describes the function of each.

2.15.2 Humidifier Sub-assembly

The sub-assembly described below consists of the following:

- A 30 pore per inch air filter
- A water wick
- A 24 VDC 150 CFM fan
- A 90˚ PVC elbow
- A float switch
- A 24 VDC solenoid valve
- A humidifier enclosure
- Two quick disconnect couplings

The sub-assembly, a two part plastic module, mounts inside via a sheet metal interface plate. The subassembly provides moist air to the imagesetter drum. Air inlet and outlet ports on the module connect the flexible air hose to each end of the drum.

The humidifier system is closed loop. The inlet port receives drum air, which passes through an air filter. The system then draws the filtered air through a water wick whose bottom section is immersed in water contained in an internal resevoir. Next, through the process of capillary action, the water draws up and saturates the wick.

A float switch controls the reservoir's water level. At a predetermined level of 1.25 inches, the float switch opens. A signal goes to the control electronics and the water solenoid valve closes. The solenoid valve mounts on top of the humidifier. Normally, the valve is closed and only opens when the reservoir requires water.

A 24 VDC fan draws the air through the filter and wick. The fan delivers up to 150 CFM (cubic feet per minute) unrestricted free air flow. Fan speed varies in relation to the amount of humidity required to reach 50% (±5%) relative humidity in the drum.

Once moisture laden, the air travels via the output port to the drum.

2.15.2.1 Water Supply

The water supply sub-assembly described below consists of the following:

- A sheet metal mounting plate/enclosure and cover
- A water reservoir
- Three feet of 1/8 inch clear tubing
- Two quick connect couplings

The water supply consists of a frosted vinyl water bag having a pop off spout for filling. The water reservoir (bag) holds approximately 2/3 gallon of water. This amount represents a three day supply minimum.

The reservoir sits in a holder mounted to the outside (left) of the imagesetter enclosure. A decorative cover, painted to match the imagesetter enclosure, surrounds the holder and reservoir. A window in the reservoir cover looks in on the water supply.

The water supply connects to the humidifier via a 1/8 inch inner diameter clear plastic supply line. The tube attaches to the bottom of the water bag and passes through a small hole in the imagesetter enclosure. Inside, the tube is dressed along the enclosure's inner wall and down to the humidifier sub-assembly.

The tube attaches to the solenoid valve using a quick connect coupling. On the opposite side of the solenoid, another coupling with a six inch section of tubing supplies water to the internal reservoir.

2.15.3 Humidifier Electronics Module

The electronics module monitors and controls the level of moisture in the drum and adjusts the air flow through the system by varying the speed of the humidifier's fan. This module also controls the on/off function of the water solenoid valve in response to the float switch.

2.15.3.1 Power

The fan power connector (J3) located on the right door supplies the +24 volts used on the board.

NOTE: The door fan is not required when the system has a humidifier installed.

The (J3) connector supplies power to the wiring harness, which in turn supplies power to the humidifier electronics module. Power from (J3) is in series with the door interlock switches. Power to the humidifier shuts off when either end cap is opened.

The +24 volt power from the engine connects to the electronics module through the (J2) connector. Power feeds through the U3 voltage regulator to generate a +12 volt source for the board.

LED CR3 acts as a visual U3 output indicator. The +24 volt power also feeds through relay K1, which controls power to the fan and water valve solenoid circuits. A software function exists for turning off the K1 relay and thus disabling the fan and solenoid functions. LED CR1 acts as a visual indicator for the switched +24 volts.

2.15.3.2 Float Switch and Water Valve Solenoid

The float switch and water solenoid, which are part of the humidifier assembly, connect to the electronics module through connector (J2). The switch and solenoid represent a closed circuit with the float switch directly controlling the water solenoid valve.

When the water reservoir is full, the normal switch condition is closed. A closed switch turns off transistor Q1, which in turn de-energizes the water valve solenoid.

When the water level in the humidifier reservoir drops below a preset level, the float switch opens, which signals resistor R10 to turn on Q1. This energizes the water valve solenoid, which opens the valve to fill the reservoir. When the water reaches the correct level, the float switch closes turning off the solenoid and halting the water flow.

2.15.4 Fan Control Circuit

The fan control circuit varies the fan speed in response to the drum's humidity level. When the level falls below 45%, the system turns the fan on at 100% drive level. When the level reaches 45%, the fan drive circuit reduces the fan speed. Speed continues to be reduced until a humidity level of 50% is achieved. Further humidity drops activate the fan and repeat the cycle.

The humidity sensing circuit consists of two sections in series:

- LM339 voltage comparator
- Humidity sensor

The voltage comparator is structured as an oscillator with the frequency controlled by the sensor. This sensor, a capacitor, varies its capacitance in relation to the amount of moisture in its environment. As the moisture level increases, the sensor capacitance also increases causing the oscillator frequency to decrease.

2.15.5 Interface Connections

The controller module connects by cable to the imagesetter through the supply sensor driver module (SSDM) board. The cable connects three humidifier functions (sensing and controlling) to the SSDM.

2.15.6 Software Functionality

The humidifier option enables and disables via the operator contol panel (OCP) configuration screen (also see user documentation). Pressing the humidifier icon on this screen displays an expanded view of both the option's current and alternate state (i.e., enabled or disable). The screen highlights (bold type) the current state.

When the humidifier option is not installed, the humidifier key shows the humidifier disabled icon.

2.15.7 Humidifier PC Board: LED Descriptions

CR1 +24 V to the fan. LED "On" = module enabled

CR3 This LED should be on whenever power is applied to the humidifier PC board.

CR7 This LED comes on when the water value solenoid is energized, opening the water value and allowing the water reservoir to fill.

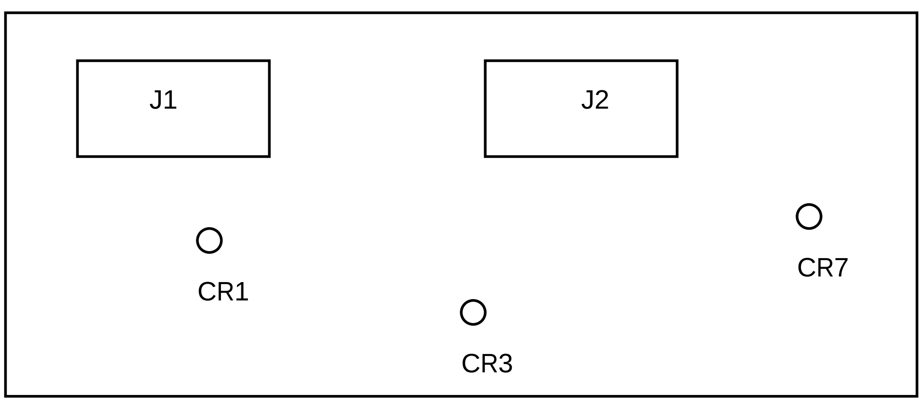


Figure 2-21 Humidifier PC board, with connectors (J1 and J2) and LED's (CR1, CR3, and CR7)

2.16 Humidifier Option: Warnings and Indications

The Run and Pause screens display the humidifier enable icon when the humidifier is enabled.

2.16.1 Humidity Low Indicator

When switching on the imagesetter, the OCP displays the humidity low icon, if humidity is below the desired level. Once the humidity reaches the desired level, the humidifier enabled icon replaces humidity low.

2.16.2 Water Supply Empty Alert

If the humidity level drops below the desired level and persists for more than:

- 15 minutes either following a power on or enabling of the humidifier
- 5 minutes after the humidity previously came up to the desired level

the system does three things:

- A blinking low humidity icon displays
- An audible alwarm sounds for 15 seconds
- The software disables the humidifier option

Typically this condition means that the water bag (reservoir) is empty. To clear the alert, you must re-enable the humidifier option.

Chapter 3:

Imagesetter Diagnostics and Vacuum System Troubleshooting Guide

3.1 Introduction

This chapter describes the diagnostic tools necessary for testing and verifying the functionality of the imagesetter. These tools include boot-up diagnostics (in ROM) and the Avantra Diagnostic Program (AVDIAG), which is PC based. This chapter also contains a troubleshooting guide for diagnosing and repairing problems with the vacuum pump system.

This section provides a detailed description of:

- Power-up Boot Diagnostics
  - Power-up Boot Diagnostics Overview
  - Power-up Boot Sequence
  - Error Reporting
  - Automatic Dial-out Feature
  - Boot Error Codes
  - OCP Run-Time Application Errors
- Avantra Diagnostic Program (PC)
  - Equipment Requirements
  - Software Installation
  - Starting the Program
  - Save and Restore System Parameters
  - Creating Corection Tables
  - Remote Diagnostics
  - Equipment Requirements
  - Hardware Configuration
  - Vacuum System Troubleshooting Guide

NOTE: PC Imager software is a tool designed to aid the service engineer when verifying image quality and communication as they relate to a raster image processor (RIP). This software is described in the PC Imager User's Manual P/N 580024-001.

3.2 Power-up Boot Diagnostics

The following section provides a description of the power-up boot diagnostics available on the Avantra system. The topics include:

- Diagnostic Overview
- Power-up Boot Sequence
- Error Reporting
- Boot Test Descriptions
- Modem Dial-out Features
- Boot Diagnostic Error Codes

3.2.1 Power-up Boot Diagnostics Overview

The power-up boot diagnostics main functions are:

- Initializing the system at reset
- Performing confidence checks on the electronics/report errors
- Supporting the diagnostic serial port for remote diagnostics and downloading of FLASHROM updates

The power-up diagnostics also support a modem/auto-dial-out feature and a debug monitor mode.

Because the Avantra is a multi-controller system, it provides two levels of tests:

- **Level One (core tests)**–executed by each micro-controller as it is taken out of reset by the DIAG. The test purpose is to verify that each micro-controller and its hardware domain are functional.
- **Level Two (micro-controller handshake tests)**–provides confidence in the inter-micro-controller communication bus and its peripherals.

Each micro-controller must be initialized prior to performing its own core and subsystem tests. At power-up the DIAG micro-controller is configured as the master device. It takes each micro-controller out of reset, initializes it, and performs basic confidence checks on the electronics. After all micro-controllers complete their tests, results are reported back to the DIAG micro-controller. If an error has been detected, the appropriate error message is reported and/or modem dial-out routine executes. If the boot is successful, the DIAG micro-controller gives up its mastership role to the DEC K-4.

3.2.2 Power-up Boot Sequence

The power-up boot sequence starts with a reset to the DIAG micro-controller. At reset the DIAG micro-controller is programmed as the master of the SPI bus and is initialized as follows:

Serial Communication: 9600 baud, 8 data bits, 1 stop, no parity

Serial Peripheral Interface (SPI) Communication mode: Master Mode

Operator Control Panel (OCP) held in reset

Digital Engine Controller (DEC-K4) held in reset

DSP held in reset

After the DIAG micro-controller initializes, it looks for a keyboard input (waits 5 seconds). A keyboard input could come from the diagnostic port via a PC connected directly or through a remote modem connection. If a key is pressed during this time, the boot sequence and the diagnostics in the monitor mode abort.

If no key is pressed, the boot checks to see if a modem is present by sending an AT modem command. If there is a modem response (OK), the dial-out feature enables. If there is no response, the dial-out feature disables.

Next, the OCP is taken out of reset. SPI communication tests execute between the DIAG and the OCP. If the tests are successful, the OCP firmware and loader revision levels appear on the control panel, and the DIAG tells the OCP to update the progress bar.

A dial-out icon appears in the middle of the display. This icon displays only during the time a manual dial-out can be performed, then it disappears. Pressing this icon key forces the system to perform a manual dial-out to a specific remote diagnostic center that has been previously programmed into the system.

The DIAG micro-controller core tests execute. The OCP updates the progress bar as the tests pass.

The 3600 and 2400 dpi correction table checksums are computed and displayed. The configuration register initializes, and the correction tables load into SRAM.

Next, the DSP micro-controller is taken out of reset. SPI communication tests execute between the DIAG and DSP. The DSP firmware revision appears on the OCP. The DSP core tests are executed. The OCP updates the progress bar as the tests pass.

Next, the DEC-K4 micro-controller is taken out of reset. SPI communication tests execute between the DIAG and DEC-K4. The DEC firmware revision appears on the OCP. The DEC core tests execute. The OCP updates the progress bar as the tests pass.

The DIAG tells the DSP to turn on the spinner motor. After the spinner motor is up to speed and the OCP progress bar updates, the DIAG switches to slave mode operation and relinquishes the SPI bus mastership roll to the DEC-K4.

The DEC-K4 SPI register and DSP handshake tests execute next. The OCP updates the progress bar as the tests pass. The DEC-K4 subsystem tests execute and progress is reported to the OCP. Next the DSP coefficient tables load. Finally the DEC-K4 switches to slave mode operation and relinquishes the SPI bus mastership roll to the OCP. The boot sequence has now been completed, and the OCP application firmware loads. Processing of remote APIS commands can now take place.

3.2.3 Error Reporting

If any tests fail, the DIAG micro-controller reports the error via the diagnostic serial port on the DEC board or, if possible, on the operator control panel. Also, if a modem is present and enabled, the diagnostics dial a telephone number that has been pre-stored in the modems configuration NVRAM. If all testing completes without errors, the message “Imaging Run Screen” appears on the control panel.

All errors that take place during normal boot testing record in EEPROM in the DEC-K4 (application errors also store here). The last 128 error codes are stored and are accessible through the remote diagnostic port. This provides a history of errors that may help in troubleshooting the system. More detailed error reporting can be obtained by running selectable diagnostics from a PC using the Avantra Diagnostic Program.

3.2.3.1 OCP Error Reporting

After DIAG to OCP communication has been established, a progress bar appears on the control panel. As each test runs successfully, the progress bar updates.

If a test fails during the boot sequence, error information appears on the control panel. The upper right hand corner displays a blinking icon of a service engineer. Below the icon a three (3) digit error number appears.

At this point, either address the error or ignore it and continue the boot sequence to operation of the system, possibly in a degraded fashion. Proceed by pressing the + icon when the error is displayed on the control panel.

If a modem is enabled and the + icon is not depressed within ten (10) seconds after the error is displayed, the diagnostic software attempts a remote dial-out. If no modem is installed or enabled, the boot sequence halts at the failed test.

3.2.3.2 Remote Terminal Error Reportiing

Boot progress is also sent through the diagnostic serial port, making it possible to remotely monitor the boot sequence. A remote terminal (PC) connected to the diagnostic port via a modem, displays the progress of the boot in simple messages (no need to decode the error numbers). Other activities performed in this monitor mode include halting or resetting the system and issuing primitive SPI commands for diagnostic purposes. A terminal connected directly to the diagnostic serial port can also perform the same functions.

3.2.3.3 LED Error Reporting

An LED on the DEC board indicates whether the boot has successfully completed. A red light indicates either that the boot sequence has not been completed or an error condition exists. When the LED goes out, the boot sequence has completed with no errors.

3.2.3.4 DIAG Micro-controller Test Descripions

The following describes tests performed on the DIAG micro-controller during the boot sequence.

3.2.3.5 Offgate Register Test

The offgate register loads the starting address pointer for both the correction SRAM and the FLASHROM. The offgate register test writes a six byte sequence, where the first three bytes represent the test data and the last three bytes are a sequence of zeros used to retrieve the previous three bytes written. As the data is read back, it gets shifted left by 5.

3.2.3.6 Ongate Register Test

The ongate register test writes a 6 byte sequence, where the first three bytes represent the test data and the last three bytes are a sequence of zeros used to retrieve the previous three bytes written. As the data is read back, it gets shifted left by 5.

3.2.3.7 Vacuum Register Test

The vacuum register is a byte wide register that, besides the vacuum select bits, contains the fake or real clock bit and the upper two bits of the FLASHROM. To test the vacuum register, a two byte pattern is written into it. The first byte is the real data and the second byte is used to retrieve the feedback.

3.2.3.8 DAC Register Test

To test the DAC register, a two byte pattern is written into it. The first byte is the real data, and the second byte is used to retrieve the feedback.

3.2.3.9 OCP Register Test

To test the OCP register, a two byte pattern is written into it. The first byte is the real data, and the second byte is used to retrieve the feedback.

3.2.3.10 FLASHROM Cheksum

The flash memory stores the 2400 and 3600 dpi correction table entries and DSP code. As the boot diagnostics progress, they display a checksum of both the 2400 and 3600 dpi correction tables for the checksum of the DSP code. The checksum algorithm is a summation of all the flash memory locations occupied by a particular table or DSP code.

3.2.3.11 Correction SRAM Test

The correction SRAM test performs a read/write test of the SRAM to verify its integrity. The correction SRAM addressing is done via the offgate register.

First, the starting address value loads into the offgate register. Second, the auto-increment mode is selected, and a pattern is written into the SRAM. Each write in auto-increment mode increments the address pointer. After the SRAM has been written, the offgate register reloads with the same starting address. The contents of the SRAM are read back and compared against the expected data pattern. Disparities are reported as an error.

3.2.3.12 Correction State Machine

The correction state machine provides event synchronization based on the phase lock loop derived from the spinner motor or a fake clock. Correction values store in flash memory and load into the correction SRAM prior to running the correction state machine. This test checks correct operation of the correction state machine by monitoring the signal at the event PAL. There should be a 5.3 KHZ pulse at the event PAL if the correction state machine is running properly.

3.2.3.13 Correction SRAM Checksum Test

After the correction SRAM load from the FLASHROM, a checksum is performed to verify that the data loaded properly. The checksum algorithm is a summation of all the SRAM memory locations occupied by the correction table.

3.2.3.14 DEC Micro-controller Test Descriptions

The following list describes the tests performed on the DEC micro-controller during the boot sequence.

- **Internal ROM Checksum–**performs a rotate and add checksum. Bytes are added to a 16-bit sum, after the sum has been rotated right one position. Bit 0 is rotated into bit 15. The resulting checksum is compared to the checksum stored in ROM.
- **DEC Offgate Register Test–**writes a three byte sequence, where the first three bytes represent the test data and the last three bytes are a sequence of zeros used to retrieve the previous three bytes written. As the data is read back, it gets shifted left by 5.
- **DEC Ongate Register Test–**writes a 6-byte sequence, where the first three bytes represent the test data and the last three bytes are a sequence of zeros used to retrieve the previous three bytes written. As the data is read back, it gets shifted left by 5.
- **DEC Vacuum Register Test–**writes a 2-byte pattern into the vacuum register. The first byte is the real data and the second byte is used to retrieve the feedback.
- **DEC to DSP SPI Link Test–**the Echo command verifies the SPI link to the DSP from the DEC. The K-4 sends an SPI echo command packet (3F 0 55 AA), which tells the DSP to echo the received packet. The K-4 sends another echo packet (3F 0 0 0) to the DSP, which reads back the contents of the first echo packet. The data read back is compared to the expected data pattern. If the comparison fails, an error is returned, otherwise the test returns a pass.
- **Carriage Test–**moves the carriage forward 1/16¨ to verify that the DEC-K4 receives the carriage encoder signal. As the carriage moves, the DSP checks for a wall condition. If a wall is detected in the forward direction, then a short move in the reverse direction is tried.

- **Supply Motors Test–**to test the motors, the supply DAC is set to 500 millivolts and one of the motors under test is selected by addressing it via port C. The supply motor DAC controls four motors:
  - Supply punch
  - Supply spindle A and B
  - Supply cassette

  The test verifies that the MOTORON bit gets asserted low, by reading the sensors. If MOTORON is not asserted within 20 milliseconds, an error is reported. The motor is then de-selected. The test verifies that the MOTORON bit gets asserted high, by reading the sensors. If MOTORON bit does not go high within 20 milliseconds, an error is reported.
- **Take-up Motors Test–**to test the motors, the take-up DAC is set to 500 millivolts and one of the motors under test is selected by addressing it via port C. The take-up motor DAC controls three motors:
  - Take-up punch
  - Take-up nips
  - Take-up cutter

  The test verifies that the MOTORON bit gets asserted low, by reading the sensors. If MOTORON is not asserted within 20 milliseconds, an error is reported. The motor is then de-selected. The test verifies that the MOTORON bit gets asserted high, by reading the sensors. If MOTORON bit does not go high within 20 milliseconds, an error is reported.
- **Video Data Path Test–**The video data path is tested by inserting a known data pattern at the video input, where it would normally be input from the CGEN bus. The data is imaged with the laser beam disabled. An extra shift register clocks out the test pattern. The video and the output of this register are exclusive ‘ORed.’ Any unequal bits will cause an error to be latched. The data pattern is generated in hardware and consists of 55's, AA's and an incrementing pattern. A check is made for the proper amount of gates per scan line.
- **DAC Loop Backs–**all the DAC generated signals that go off the board are looped back to a single A/D input on the DEC K-4. The various signals are summed. The signals not being tested must be set at 0 volts. Some of the DACs are written by the DSP, others by the SPI master, either the DIAG or the DEC micro-controller.

3.2.3.15 DSP Micro-controller Test Descriptions

The following list describes the tests performed on the DSP micro-controller during the boot sequence:

- **RAM Test–**since the DSP runs out of RAM, it is not useful to run a checksum on the code. If the DSP runs, the ROM is OK. If the external RAM is included, the software runs a march test and an address as data memory test on the external memory.
- **Port Test**–the hardware loops back one bit from the DSP output port to the DSP input port. The software sets the bit high and verifies that it is high on the input. Then the software sets the bit low and verifies that it is low on the input port.
- **Spinner Verify Test**–applies a short burst to the spinner motor and verifies that the expected change in the spinner count value was correct. This verifies that the spinner encoder was connected. It also confirms that the spinner data input port was at least minimally functional before spinner power-up is attempted.
- **SPI Communications Verify–**the DSP SPI line connects the output port of the DSP to the DEC and the DIAG processor. At boot time the software sets this signal low. When the first stage of the diagnostics are complete, the software sets the DSP SPI signal high to indicate that it is ready for commands from the DIAG. The DIAG sends a command packet to the DSP to echo the data in the packet. This verifies the SPI communications link.
- **Phase Lock Loop Verification–**verifies the accuracy of the system phase lock loop upon command from the DEC. The software compares the timing of the external 5.333 KHZ interrupt with the interrupt generated internally. If the interrupt timings are not comparable, an error appears.

3.2.3.16 OCP Micro-controller Test Descriptions

The following list describes the tests performed on the OCP micro-controller during the boot sequence:

- **External ROM Checksum–**performs a rotate and add checksum on the entire FLASHROM. Bytes are added to a 16-bit sum, after the sum has been rotated right one position. Bit 0 is rotated into bit 15. The resulting checksum is compared to the checksum stored in ROM at location 0. The ROM size is stored in location 2; 1=128K, 2=256K.
- **Display Controller Test–**writes and reads the cursor, which verifies that the data path to the controller is functioning correctly.
- **Display RAM Test–**perform a read/write test of the display RAM to verify its integrity. Several data patterns write to the RAM. The contents of the display RAM are read back and compared against the expected data pattern. Any discrepancies report as an error.

3.2.4 Automatic Dial-out Feature

During the power-up boot sequence, the diagnostic firmware attempts to call out to a remote field service site in the event of an error. The number dialed is pre-stored in the modem's configuration profile.

At the beginning of the boot sequence the firmware sends an attention command (AT) to the modem and waits for a response. If the modem responds with an OK, the dial-out feature enables. If there is no response, the dial-out feature disables.

No response could mean that either no modem is installed/powered on or the modem is currently on-line and in data mode. The operator inhibits an automatic dial-out by pressing the + icon on the control panel after encountering an error. If the + icon is pressed within 10 seconds after the error is displayed, the boot sequence resumes and tries to complete. The steps proceed as follows:

1. Modem Initialization

   Before dialing out, the diagnostic firmware initializes the modem. The firmware waits for an OK response from the modem before continuing. If the response is not received within 4 seconds, the firmware sends the string again. To break out of this loop, reset the system/modem.

   ATE0V1X4&C0&D0S7=120

2. Modem Dial-out

   After the initialization string has been responded to, the modem dials out the pre-stored telephone number in the modem's configuration profile. The modem stores up to four telephone numbers in non-volatile memory, 0 - 3. The telephone number must be stored in location 1. The firmware issues the dial command ATDS=1 to the modem.

   Once the command is sent, the firmware waits for a response string. If there is no response string after four minutes, the firmware times out, then hangs up the connection and tries again. If a response is received, it is compared first against a CONNECT message. If a match occurs, the firmware proceeds to the login procedure. If the response is BUSY or NO CARRIER, the firmware hangs up, waits four minutes, and tries dialing out again. This continues until a CONNECT message is received.

3. Login Procedure

   Once a connection has been established, the firmware transmits the log-in prompt ARWIN to the remote site. The Avantra waits until it receives the proper log-in name ARROW. When the log-in name has been received, full access to the system is allowed.

4. Modem Hang Up

   The firmware sends a hang-up string to the modem to hang up the telephone line. The hang-up string is:

   +++ATZ

3.2.5 Boot Error Codes

Table 3-1 lists the Avantra boot error codes.

Table 3-1 Boot error codes.

Error Code	Description
135	Spinner Overspeed error
136	Door Open during Boot
137	OCP Hardware Handshake error
138	DEC flash ROM is blank
139	Cannot switch K-4 to master mode
140	DSP hardware handshake error
141	Cannot Set DACs to zero
142	Carriage DAC failed to go low (-4 volts)
143	DAC failed to go high (+4 volts)
144	Supply current DAC failed
145	Take-up current DAC failed
146	Spinner DAC failed
147	Take-up servo DAC failed
148	Supply servo DAC failed
149	Spinner did not lock
150	Offgate register failed
151	Ongate register failed
152	Vacuum register failed
153	Diag to OCP handshake failed
154	Diag to DSP handshake failed
155	Diag to DEC K-4 handshake failed
156	DEC K-4 offgate register failed
157	DEC K-4 ongate register failed
158	DEC K-4 vacuum register failed
159	DEC K-4 to DSP handshake failed
160	Carriage Sensor/Cable not connected
161	Carriage not in idle state
162	Cannot command DSP to zero-out carriage position loop
163	Cannot command DSP to move carriage
164	Cannot command DSP to stop carriage
165	No carriage encoder pulses
166	Missing (not enough) encoder pulses

Error Code	Description
167	Cannot command DSP to move carriage in reverse
168	No times 4 carriage encoder pulses
169	Missing (not enough) times 4 encoder pulses
170	Supply sensor/cable not connected
171	Supply punch motor on failed
172	Supply punch motor off failed
173	Supply spindle 1 motor on failed
174	Supply spindle 1 motor off failed
175	Supply spindle 2 motor on failed
176	Supply spindle 2 motor off failed
177	Supply cassette select motor on failed
178	Supply cassette select motor off failed
180	Takeup Sensor/Cable not connected
181	Take-up punch motor on failed
182	Take-up punch motor off failed
183	Take-up nips motor on failed
184	Take-up nips motor off failed
185	Take-up cutter motor on failed
186	Take-up cutter motor off failed
187	Take-up cassette core motor on failed
188	Take-up cassette core motor off failed
191	Image Buffer: Error Bit set
192	Image Buffer: Buffer not ready
193	Image Buffer: Packet Count not equal to 2
194	Image Buffer: Error Bit remains set
195	FlapperA Motor ON Error
196	FlapperA Motor OFF Error
197	FlapperB Motor ON Error
198	FlapperB Motor OFF Error
200	Bridge /Buffer Comm Error at Boot
201	Bridge /Buffer Servo 1 motor test failed
202	Bridge /Buffer Servo 2motor test failed
203	Bridge /Buffer brake motor on test failed
204	Bridge /Buffer brake motor off test failed
205	Bridge /Buffer shuttle motor on test failed
206	Bridge /Buffer shuttle motor off test failed

3.2.6 OCP Run-Time Application Errors

Table 3-2 OCP Run-Time Application Errors

Error Code	Description
1	Carriage Jam
3	Cutter Jam
4	Out of Media
5	No Take-Up Cassetts
6	Media Jam
7	Take-Up Punch Jam
8	Cutter Off Sensor
10	Take-Up Cassetts Mismatch
11	Page-Length Error
12	Hardware Error
13	Left Door Open
14	Missed Breakpoint
15	No RIP Cable
17	Spinner Over Speed
22	Spot Changer Jam
23	Check Sum Error
27	Processor Off-Line: Warning
28	EEPROM Error
31	Supply Punch Jam
33	No Media Loaded
34	Take-Up Cassette Full
36	Supply Cassette Select Jam
37	Take-Up Cassette Core Jam
38	Focus Jam
39	Polarizer Jam
40	Diagnostic Error
41	Bridge Not in Position
42	Right Door Open
43	Unknown SPI Command
44	Cut Not Allowed
45	Load Not Allowed
46	Laser Bad
47	Carriage Speed Error
48	Invalid Configuration
49	EEPROM Write Error
50	Password Error

Error Code	Description
51	Bridge Comm Error
52	Bridge Jam Before Center Sensor
53	Bridge Jam at Processor
54	Bridge Jam Before Clear
55	Bridge Motor Jam
56	Bridge Has No Media at Input
57	Processor Off-Line: Fatal
58	Processor Not Communicating
59	Processor Top Cover Open
60	Processor Garbled Communication
61	No Carriage Encoder Mix
62	Possible Out of Media (or Jam)
63	Beam Compressor Jam
64	Falpper Jam
65	Media Warranty Met (Exceeded)
66	Media Runaway
67	Media Blocking T/U Sensor
68	Jam in Buffer Before Buffer Entry
69	Jam in Buffer Before Purchase Sensor
70	Jam in Buffer Before Exiting to Processor
71	Jam Moving Buffer Carriage
72	Jam Moving Bridge Shuttle
73	Bridge Up, Cannot Move Shuttle
74	Bridge Foot Missing
75	Bridge Communication Overflow
76	Bridge Jam Before Exit Sensor
77	OLP Front Sensor Not Reached
78	OLP Rear Sensor Not Reached
79	Media Partially Loaded
80	Bridge Up–Illegal Mode
81	Vector in Service
82	Unknown Bridge Error
83	Buckle in Drum
84	Missing Spinner Index Pulses
85	Extra Spinner Index Pulses
86	Forced Rewind
87	No Load–12 mil Too Low

Error Code	Description
88-98	Unused
99	Multiple Code Error *

* On Error Code 99, keep pressing + key to display all errors.

3.3 Avantra Diagnostic Program (PC)

The Avantra Diagnostic Program (AVDIAG) software tool was designed to help diagnose and debug hardware problems. The program also helps when querying for parameters, firmware revisions, error logs, etc. and downloads new firmware into FLASHROMs.

The Avantra diagnostic tool is a software-based system that communicates with the output imagesetter via the RS-232 serial port of the PC and the imagesetter's remote diagnostic port. Information is exchanged and functions executed by sending commands to the imagesetter. These commands are loosely based on the Agfa Print Engine Interface Specification (APIS) but do not follow that specification fully. The Avantra Diagnostic Program can be used locally with a direct connection or remotely via a modem.

3.3.1 Equipment Requirements

Several items are required prior to the use of the Avantra Diagnostic software. The first item is a portable computer (PC). We recommend the Dolch 386 since the Avantra diagnostic software was extensively tested with this unit. Other PCs can be used, but correct operation cannot be guaranteed. The following lists minimum PC requirements:

- 386 CPU
- 8MB RAM
- EGA/VGA/monochrome display
- DOS 6.0 or greater
- Windows 3.1 software or later
- An available serial port
- PROCOM Plus

The following lists items and part numbers needed to use the diagnostic tool, either using a direct connection to a PC or through a modem:

Direct Connect:

• Avantra diagnostic software	700594-1003*
• 9-pin female connector (PC end)	78448-015
• 25-pin male connector (imagesetter end)	78448-016
• Cable	78448-008

* This may not be the latest revision of software. Refer to OMNI Bulletin Board for latest revision of AVDIAG Program.

Remote:

Refer to Section 3.4, for a detailed list of requirements.

3.3.2 Software Installation

The software installation procedure for the Avantra Diagnostic software is simple and quick. The software comes on one (1) 3.5" floppy disk. The software includes the Avantra diagnostic executable file and a set of predefined command files. Use the following procedure to install the software:

1. Turn the PC on and wait for the DOS prompt.
2. Insert the Avantra Diagnostic software floppy disk into the drive.
3. Type in the following:

   C:> a:install c:\avantra <RETURN>

   Install.bat is a self extracting compressed file that creates all the required directories and sub-directories on the PC's hard disk and copies the Avantra Diagnostic files to the appropriate places. The following directories are created on the hard disk:

   c:\avantra\default
   c:\avantrag\cmd
   c:\avantra\download

4. After the files have been successfully copied to the hard disk, remove the Avantra Diagnostic software diskette from the floppy drive.

3.3.3 Starting the Program

The following procedure describes how to load, initialize, and start the Avantra Diagnostic Program (AVDIAG):

1. Insure that the Avantra diagnostic software has been properly loaded onto the PC as described in Section 3.3.2.
2. Connect the serial cable from one of the serial ports of the PC (must be com 1 or 2) to the Avantra's diagnostic serial port located on the inside of the system on the DEC I/O panel.
3. The imagesetter should be powered up at this point and in an idle state. Turn on the PC, change to the Avantra directory and start the program. Type:

   C:\avantra> avdiag <RETURN>

   Upon execution, AVDIAG sends out an enter service {MXES111111} command to the imagesetter's remote diagnostic port. This puts the imagesetter in a state to accept and perform commands sent to the port.

   NOTE: This state renders the OCP inoperable until the imagesetter has been reset or power cycled.

4. The program displays the firmware revision levels of the imagesetter. Press any key to continue.

   The main menu bar appears at the top and is ready for the user to select a function.

3.3.3.1 User Interface

The top bar menu contains the following groups of sub-menus:

- TEST
- ALIGN
- UTILITIES
- FLASHROM
- EXIT

Test Menu

Test menu items are:

- Selectable Tests
- Download CMD File
- Functions

Selectable Tests

Displays a dialog box with the following tests:

Test	Function
DEC. Tests	DEC. - K4 Module Test
DAC. Ramps	Ramps cycles for O-Scope Monitoring
Carriage Tests	Carriage Movement Tests
Media Tests	Media Motor Tests
OCP Tests	OCP Module Tests
Boot Tests	Boot Sequence Tests
Bridge Tests	Bridge/Buffer Tests
Open Log File	Save all Diagnostic output to a Logfile
Close Log File	Close the Logfile

Inside the module menu, choose All Tests or a single test. The test module allows the user to loop on a test in certain modes. The test modes are:

- Single Pass–runs test only once, displaying pass/fail error code.
- Continuous–runs tests the number of cycles entered, ignoring errors.
- Halt@Error –runs tests the number of cycles entered, stopping if an error occurs.

DEC Tests

Test	Function
Register Test	Test SPI registers (offgate, ongate, vacuum, vacuum 2)
DSP Echo Test	Verify DEC - DSP communications
Carriage Test	Verify encoder feedback from carriage movement
Supply Motor Test	Supply Motor on/off bit tests at 0 current
Take-up Motor Test	Take-up motor on/off bit tests at 0 current
Video 1 Int Test	Image buffer test with 0x55 pattern
Video 2 Int Test	Image buffer test with 0xAA pattern
Video 3 Int Test	Image buffer test with incrementing pattern
Sensor Test	Verify Sensor Array integrity (Not all FFs)
Vid Path-All Test	Post PWM Video Path Test for all resolutions (VIDTEST bit at beam-on)
OCP Echo Test	(Unimplemented)
K1 SRAM Test	
Vid Path-12 Test	Post PWM Video Path Test for 1200dpi (VIDTEST bit at beam-on)
Vid Path-18 Test	Post PWM Video Path Test for 1800dpi (VIDTEST bit at beam-on)
Vid Path-24 Test	Post PWM Video Path Test for 2400dpi (VIDTEST bit at beam-on)
Vid Path-36 Test	Post PWM Video Path Test for 3600dpi (VIDTEST bit at beam-on)
Supply Punch Test	Supply Punch Motor-on/off bit tests at 0 current
Spindle B Test	Spindle B Motor-on/off bit tests at 0 current
Spindle A Test	Spindle A Motor-on/off bit tests at 0 current
Supply Cassette Test	Supply Cass. Motor-on/off bit tests at 0 current
Take-up Punch Test	Take-up Punch Motor-on/off bit tests at 0 current
Nips Test	Nips Motor-on/off bits tests at 0 current
Take-up Cutter Test	Cutter Motor-on/off bit tests at 0 current
Take-upCassette Test	Takeup Cass. Align Motor-on/off bit tests at 0 current
Carr Speed Var Test	
K1-SRAM Data (0x55)	
K1-SRAM Data (0xAA)	
K1-SRAM Data (0xCC)	
K1-SRAM Data (0xF0)	
K1-SRAM March (1's)	
K1-SRAM March (0's)	
K1-F1.ROM CHECKSUM	

DAC RAMPS

NOTE: These tests can only be performed in manufacturing during board test. Running these tests on the PC will post an error.

- All Ramps On
- All Ramps Off
- Density DAC
- Mag DAC
- Linearity DAC
- PWM DAC
- DSP DAC

CARRIAGE TESTS

Test	Function
Carriage	Slew Carriage over max. travel distance
Focuser	Move Focuser over max. travel distance
Spot Changer	Move Spot Changer to each resolution setting
Polarizer	Move Polarizer over max. travel distance

MEDIA TESTS

NOTE: To actually see the motors moving, you need to run these tests in continuous mode with a pass count of 10.

Test	Function
Cutter	Executes a Media take-up Punch
Take-up Punch	Execute a Head Clamp-Punch-Home sequence
Supply Punch	Execute a Tail Clamp-Punch-Home sequence
Nip Solenoid	Open-Close Nips
Spd. Selector	Moves from one spindle to the other
Spd. Motor A	Turns Spindle Motor A On/Off
Spd. Motor B	Turns Spindle Motor B On/Off
Supp Feed Motor*	Turns Feed Motor On/Off
Tkup Align Motor**	Turns Align Motor On/Off
Flappers***	Cycles flappers down and up
Brushes	Cycles brushes up and down

* This motor will only turn off if the media sensor is covered or errors are turned off.

** Take-up cassette must be in system for this test to pass.

*** If the carriage is not centered on the drum, the flappers will be damaged.

OCP TESTS

Test	Function
FLASHROM Checksum	Display Additive checksum of the OCP FLASHROM

BOOT TESTS

Test	Function
Diag-Ocp Hadshk Test	Verify Diag-Ocp communications in Master Mode
Offgate Reg Test	Test SPI Offgate Register
Ongate Reg Test	Test SPI Ongate Register
Vacuum 1 Reg Test	Test SPI Ongate Register
Vacuum 2 Reg Test	Test SPI Ongate Register
Cor3600 Checksum	Display 3600dpi Correction Table FlashRom Checksum
Cor2400 Checksum	Display 2400dpi Correction Table FlashRom Checksum
DSP FlashRom Checksum	Display DSP Code FlashRom Checksum
Diag-DSP Hndshk	Verify Diag-DSP Communications in Master Mode
Diag-K4/1 Hndshk	Verify Diag-K4/1 Communications in Master Mode
DAC Zeroing Test	Zero the DACs
CarrDac Low Range	Test Carriage DAC at Low Range
Supp. CurrDAC Test	Test Supply Current DAC
Tkup. CurrDac Test	Test Takeup Current DAC
Spinner DAC Test	Test Spinner DAC
Takeup DAC Test	Test Takeup Motors DAC
Supply DAC Test	Test Supply Motors DAC
CarrDAC Full Range	Test Carriage DAC at Full Range

BRIDGE TESTS

Test	Function
SRAM Data Test	
SRAM March Test	
Servo1 Test	Test Bridge Servo Motor
Servo 2 Test	Test Buffer Servo Motor
Buffer Carr. Test	Moves Buffer Carriage to Processor Sensor and then to Bridge Home Sensor
Br. F1 ROM Checksum	
Shuttle Motor Test	Test Shuttle Motor
Brake Motor Test	Test Buffer Brake Solenoid

OPEN LOG FILE

When opened, this log file keeps track of all errors posted during selectable testing. To view errors, enter the Utilities Menu and select Edit Files.

CLOSE LOG FILE

This closes the opened log file above.

Download File

- Command Files

  This program allows the creation of ASCII command files containing a sequence of commands to be sent to the imagesetter's remote diagnostic port. This is a description of the command files supplied with the program and the text of typical command files.

CAUTION: Running some of the command files below could cause system problems. Refer to table footnotes for details.

The current set of command files include:

Command	Function
SETMPS52.CMD*	Sets Media Parameters prior to FSB #10
SHIP.CMD	Used by Manufacturing prior to system being shipped
CARRSLEW.CMD	Repeatedly slew the carriage in both direction
SUPLFEED.CMD	Execute the feed motors as if loading media
REVFEED.CMD	Execute the feed motors as if unloading media
IMGFEED.CMD	Execute the feed motors as if feeding media normally
MEDIA.CMD*	Sets Media Parameters prior to FSB #10
SETIPS.CMD*	Write the default imaging parameters to the imagesetter
SETMPS.CMD*	Write the default machine values to DEC. EEPROM

* You should back up your machine parameters prior to running these commands. These commands load old default values or zero out some machine parameters. This causes system problems, if the backed up machine parameters are not downloaded to the imagesetter after running these tests. Some of these command files have been eliminated from newer releases of AVDIAG software.

Command File Format

The following is the format of a typical command file.

```
# a comment not to be executed
# This file will first Home the carriage and then
# slew the carriage between 8000 and 30000, repeating 10 times
SPI CARR_HOME
CMD_REPEAT 10
SPI SLEW 8000
SPI SLEW 30000
INC_PASS
CMD_ENDREPEAT
```

Functions

- Send APIS Message

  Allows the user to send a raw APIS message to the remote diagnostics port. This allows the testing of new commands not yet supported by AVDIAG, commands not yet defined in the imagesetter firmware and error messages. Commands are case sensitive. For example, the following command opens nips.

  MXDS018E

- Batch Commands

  Allows the user to send SPI commands to the imagesetter. The CMD files are made up of SPI commands. Edit these files for SPI commands. These commands are case sensitive.

  Examples are:

Commands	Function
SPI OPEN_NIPS	Opens Nips
SPI CLOSE_NIPS	Closes Nips
SPI SUPPLY_PUNCH_HOME	Supply punch goes to home position
SPI TAIL_PUNCH_HOME	Tail punch goes to home position

- ATI Input/Output

  This allows programming of an ATI port located on the PC. This port is not currently being used.

ALIGN MENU

Imagesetter Configuration

This menu item displays a window containing the currently set options and changes any option setting and saves the configuration to the imagesetter. This setting stores as a machine parameter in DEC EEPROM.

The currently settable options are:

Machine Type............Set Machine ID to all the different Avantra engines

Options	Function
Head Punches	Punches at the takeup cassette side of the media path
Tail Punches	Punches at the supply side of the media path
Dual Spindles	Two media supply sources
Media Thickness	Allows for different thickness media to be used
Media Width	Allows for media widths of .01 increments
Bridge-Up Sensor	Enable/disable Bridge-up Sensor (AV44)
30K Spinner	(future option)
Multiple Spot Flag	SGM with four aperture flags (all AV44)
APIS Buffer	Avantra with APIS Buffer option (AV44)
Extra Supply Feed	An additional 4 inch feed during new media loads
Carr Home @ Ea Image	Home carriage after each image (AV44)
Wrong Read Mode	Type of Wrong Reading (Fast Scan or Slow Scan)
Humidifier	Enable humidifier icon in configuration screen
Bridge/Buffer Board	Enable for OLP systems
Leakless Vacuum	Enable for systems with improved vacuum
Widened Media Width	Enable for Avantra 30 with 13.3" media
Real-Time Clock	Enable for systems that support real-time clock
12 Mil Plate Rewind	

SGM-A/B Mod Align

This menu item controls the alignment of the SGM parameters. The SGM-A/B Mod Align Menu appears as follows:

Spinner......................... ON/OFF	Beam............................. ON/OFF
(BM) Resolution............ 3600	(BM) Gate Start.............. 0
(BM) BOL Position........ 0	(BM) Gate Length.......... 25
Focus............................ Home/In/Out	36/44 Focus Mot. Rt........15300
Focus Steps...................0	Polar. Motor Rate........... 1600
Polarizer........................ 0	Spot Motor Rate............. 4500
Aperture........................ 0	S-Current Offset............. *
A/B Mod........................ ON/OFF	
Beam Comp.................. In/Out	
Beam Comp Rate......... 0	Beam Comp Offset..... 0

* Perform supply motor offset procedure to get this value.

NOTE: Motor rate values change from above values.

These are the menu items and their functions:

Menu Item	Function
Spinner ON/OFF	Turn the spinner on/off
Beam On/OFF	Turn the beam on/off
Resolution (Beam On)*	Set the Resolution
Gate Start (Beam On)*	Start of where the Beam turns On
BOL Position (Beam On)*	Set the beginning of scan line position
Gate Length (Beam On)*	Set the length of the beam (25 Inches)
Focus - HOME	Move the focuser to the HOME position
Focus - IN	Move the focuser in by the amount set by Steps to move
Focus - OUT	Move the focuser out by the amount set by Steps to move
Focus - Steps to move	Sets the number of steps, in either direction, to move the Focuser
Polarizer	Set the course density by adjusting the polarizer
Aperture	Set the spot size and the corresponding resolution
Motor Rate	Set the Aperture/Polarizer Stepper Motor Rate
A/B Mod On/Off	Turns A/B Spindle Modulation On/Off
S-Current Offset	Value to balance A/B Spindle modulation
Beam Comp In/Out	Moves Beam Compressor Motor In/Out
Beam Comp Rate	Speed of Beam Compressor Motor
Beam Comp Offset	Offset to Home value of Beam Compressor Motor

* You must follow these commands by a Beam On to activate.

Defaults: Resolution will be set to 3600

Gate Start to 0

Gate Length to 25

Aperture to 3600. The resolution will automatically change to the aperture's value.

Carriage Alignment

This menu item allows the alignment of the carriage encoders. This function executes a test on the DSP, reads in the values resulting from that test, displays the values, and calculates new encoder constants and writes the new encoder constants to DEC EEPROM. The user should reboot the imagesetter after running this test. To view new values, load down DEC Machine Parameter and select DEC (Plate/DSP).

DEC Machine Parameters

NOTE: To view the following parameters you must first load down the DEC machine parameters. See Section 3.3.4.1

Image/Focus

Selecting Image/Focus displays a dialog box that shows the current image and focus parameters stored in the imagesetter. These parameters reside in DEC EEPROM. The software retrieves these parameters from EEPROM upon entering this menu selection. Listed below are the image and focus parameters, ranges and default values.

DEC (Image/Focus/Bridge)

Parameter	Value	Parameter	Value	Parameter	Value
BOL Offset..........	*	Polarizer Home....	*	Brdg Max. Torque	250
Carriage Home.....	*	Focus Position.....	*	Buffer Med Spd.....	11421
PWM @1200.......	*	Focus Steps/Mil...	22	Bridge On Delay....	1
PWM @1800.......	*	Focus Motor Rate	15300	Ubr FastSp Thin...	4500
PWM @2400.......	*	Polarizer Rate......	1600	Ubr SlowSp Thin..	6500
PWM @3600.......	*	Spot Motor Rate...	4500	Lbr SlowSp Thin...	62
Magnification.......	*	Beam Comp Rate	1600	Lbr SlCurr Thin....	70
Linearity.............	*	Beam Comp Offse	*	BrOffElyTimThin	90
SlowScan MAG...	*			Ubr FastSp Thick...	5500
SlowScan PHASE	0			Ubr SlowSp Thick	5500
SlowScan CONST	0			Lbr SlowSp Thick	62
				Lbr SlCurr Thick...	70
				BrOffElyTimThick	20
Vacuum Control...	1	Film Brush Ctrl...	4		
1st Ramp Steplgth	100	Paper Brush Ctrl...	22		
1st Ramp Spd......		Plate Brush Ctrl...	22		

* System dependent

NOTE: The above values may be different depending on the revision of the software loaded into your system. Refer to the CSB (Customer Service Bulletin) for the current values for that version of software.

Write new values to the imagesetter by typing in the appropriate parameter. Listed below are the parameters and defaults.

Bridge Max Torque	The maximum torque of the upper bridge motor. Defaullt is 250. Increasing the calue increases the torque.
Buffer Med Spd	The buffer medium speed, which controls how fast the media is delivered from the buffer to the first set of input rollers on the processor. Default is 11421. Increasing this value decreases the speed.
UpBrdg Fast Spd	The fast speed of the upper bridge motor, which properly maintains the slack loop. Default is 4500 thin and 5500 thick. Increasing the value decreases the speed.
UpBrdg Slow Spd	The slow speed of the upper bridge motor, which properly maintains the slack loop. Default is 6500 thin and 5500 thick. Increasing this value decreases the speed.
LwBrdg Slow Spd	The slow speed of the lower bridge motor (Take-Up Cassette Core motor), which properly maintains the slack loop. Default is 62 both thin and thick. Increasing this value increases the speed.
LwBrdg Slow Curr	The current of the lower bridge motor (Take-Up Cassette Core motor), which properly maintains the slack loop. Default is 70 for both thin and thick. Increasing the value increases the torque.
BrdgeOffEly Time*	The bridge motor turn off just prior to the feed servo motors, which maintains the slack loop. Default is 50 thin and 20 thick. Increasing this value increases the torque.

*This value must be set larger than the NipsOpEly Time field.

Media

Selecting Media displays a dialog box that shows the current media parameters stored in the imagesetter. These parameters are in DEC EEPROM. The software retrieves the parameters from EEPROM upon entering this menu selection.

NOTE: Some of the values below may change from system to system.

Variable Media Parameter	Film (3-5) Narr	Film (3-5) Med	Film (3-5) Wide	Film (6-8) Narr	Film (6-8) Med	Film (6-8) Wide	Film (9-12) Narr	Film (9-12) Wide	Paper Narr	Paper Wide
S-Feed Current	24	24	24	40	46	50	50	32	2	34
T-Compress Curr	24	24	24	36	40	60	60	28	24	24
T-Compress Speed	6	6	6	12	12	12	12	6	6	6
Midpoints (.01”)	M4..............2400		M8...............2400			M12............2600		MP.............3050		
	W4.............3000		W8..............3000							

Parameter		Parameter		Parameter		Parameter	
S-Feed Speed	*	TU Align Cur-N	128	TU Start Dly	0	PP-PushDist	33
S-Hold Speed	12	TU Wind Cur-N	75	TU Dly/Dist	100	PP-PushCurr	24
S-Hold Curr	25	TU Align Cur -W	128	TU Beg. IRge	112	PP-PushSpd	8
S-Rew Curr	255	TU Wind Cur-W	75	TU End IRge	204	PP-HPul Len	5
S-A/B Offset	*	TU Align Cur -Pl	128	ImgFd Cst Dly	10	PP-HPul Spd %	1
S/TU Delay	0	TU Wind Cur-Pl	75	Rev SupSvoCur	60	P-LPul Len	2
Media Setl Dly	40	TU Align Spd-N	60	Rv-TUSvoCurPap	30	P-LPul Spd %	3
Nip Delay	30	TU Wind Spd-N	65	Rv-TUSvoF/Pl	80	PP-PreRmpDly	1
Out of Media Ctl	450	TU Wind Spd-Pl	65	Extra Fd Len	70	VacOn Tim	30
Spdl Fwd Asst	50	Nips Op Ely. Time	1	S Cmp Curr Rtio	50	VacOff Time	10
FeedHold Curr	12	FeedHold Spd	8	TU Ramp St	180	TU Ramp St-P	160
				TU Svo FuSp	90	USvo FuSp-P	85

* System dependent

Special Notes

1. The “S-Feed Speed” value may be different between standard Avantras and Avantra “S” systems. Check Machine Parameters of the software revision that is loaded into your system.

2. The "T-Compress Speed" is really the compression speed for both supply and take-up servo motors. The supply servo uses a percentage of the "T-Compress Curr" value. The percentage amount is specified in the "S Cmp Curr Rtio" field, which has a default of 50 (50%). So if:

   T-Compress Curr = 24

   T-Compress Speed = 6

   S Cmp Curr Rtio = 50

   Then the take-up servo runs at a speed of 6 and a current of 24. The supply servo runs at a speed of 6 and a current of 12.

   NOTE: The above values may be different depending on the revision of software in your system. Refer to the Customer Service Bulletin (CSB) for the correct values for that revision of software.

Write new values to the imagesetter by typing in the appropriate parameter. Listed below are the media parameters, ranges and definitions.

Media Parameter	Range	Definitions
Supply Motor Feed Current	(0 - 255)	Current of supply motor during feed.
Supply Motor Comp Current	(0 - 255)	Current of supply motor during compression.
Supply Motor Comp Speed	(0 - 255)	Speed of supply motor when going into compression.
Supply Feed Speed	(0 - 255)	Speed of supply motor during feed.
Supply Hold Speed	(0 - 255)	Supply hold speed for punchless systems.
Supply Hold Current	(0 - 255)	Supply Hold Current for punchless systems.
Supply Rewind Current	(0 - 255)	Current of supply cassette motor during rewind.
Supp/Tkup Delay*	0 - 100 take-up motor starts before supply motor 101 -200 supply motor before servo	The start-up delay time between the take-up servo and supply servo motors. Default is 0 (zero), which indicates that the delay time parameter is not being used.
Media Settle Delay	(0 - 999)	Settling time of media.
Nip Delay	(0 - 100)	Delay after Nips are open/closed.
Image Feed Length	(0 - 3600)	Image feed length from AVDIAG.
S-Spind Fwd Assist		The supply spindle forward assist current, which is the amount of current applied to the supply cassette revind motors in the forward direction. Used at the beginning of all supply and image feeds. Default is 50 (fifty)).

Media Parameter	Range	Definitions
T/U Cassette Align Current	(0 - 255)	Current for takeup cassette motor to move core to home position.
T/U Cassette Wind Current	(0 - 255)	Torque of takeup cassette motor (Forward Direction).
Nips Op Ely Time**		The amount of time the nips are opened prior to stopping the feed servos at the end of the feed, which aids in preventing buckles and lifting of media on the drum. Default is 1 (one). Increasing this value increases the time.
T/U Cassette Start Delay	(0 - 255)	Delay of takeup cassette motor to start.
T/U Cassette Delay Distance	(0 - 255)	The distance from the cutter to the top of the T/U cassette core. This is so we know when to start turning the T/U cassette core (Approx. 6 inches).
T/U Cass Beg. Illegal Range	(0 - 255)	Beginning of the range which the media is not supposed to stop (6 inches).
T/U Cass End Illegal Range	(0 - 255)	Defines the zone in which the leading edge of the media is not supposed to stop (12 inches).
Img Feed Coast Dly		The media is allowed to coast to a stop to allow time to check the optical sensors (i.e., the media present sensors). Default is 10 (ten).
Takeup Ramp Start		The starting point of the decelaration ramp of the take-up servo motor. Default is 180. Enter 0 (zero) in this field and 30 (thirty) in the NipsOpEly time field to disable the ramp. Increasing this value makes the starting point of the ramp earlier.
Rev Bump Time		The amount of time that the reverse bump, which reduces the media stiction to the drum, is in effect. Default is 1 (one).
Rev-TU Servo Curr		The reverse take-up servo motor current. Default is 30 (thirty). Increasing this value increases the torque.
Rev-TU Servo Speed		The reverse take-up servo motor speed, which prevents the supply servo motor from pulling the media up against the shrouds while rewinding the media. Default is 170.
Extra Feed Length***	in tenths of an inch	The amount of extra feed after an initial load. Default is 70, which equals 7inches. Increasing this value increases the fed length.
Supply Roller Feed Delay	(0 - 255)	Delay of takeup nip roller motor to start running before supply motor feed.

* If the value entered for this parameter is greater than 100, 100 must be subtracted from the value to obtain the actual delay time. For example, if the value = 105, subtract 105 from 100 to determine the delay time; i.e., 5 ms.

** If the bridge is in use, the value must be less than the BrdgeOffEly Time field, so that the bridge shuts off, the nips open, and the feed motors stop.

***This field will only be in effect if the Extra Supply Feed in the Imagesetter Configuration Menu is enabled.

DSP/Plate

Selecting DSP displays a dialog box that shows the current Plate/DSP parameters stored in the imagesetter. These parameters are in DEC EEPROM. The software retrieves them from EEPROM upon entering this menu selection. New values are written to the imagesetter by typing in a new value in the appropriate parameter. The DSP values are achieved after running the carriage align test.

.

Variable Media Parameter	Plate (3-5) narr	Plate (3-5) med	Plate (3-5) wide	Plate (6-8) narr	Plate (6-8) med	Plate (6-8) wide	Plate (9-12) narr	Plate (9-12) wide	DSP #	DSP Offset	DSP Data
S-Feed Curr	24 (0x50)	24 (0x53)	24 (0x56)	24 (0x59)	24 (0x5C)	24 (0x5F)	32 (0xB2)	32 (0xB5)	0	0x3C	0x*
T-Comp Curr	24 (0x51)	24 (0x54)	24 (0x57)	24 (0x5A)	24 (0x5D)	24 (0x60	28 (0xB3)	28 (0xB6)	1	0x3D	0x *
T-Comp Spd	6 (0x52)	6 (0x55)	6 (0x58)	6 (0x5B)	6 (0x5E)	6 (0x61)	6 (0xB4)	6 (0xB7)	2	0x3E	0x *
Nip Cycle	61 (0x44)			41 (0x46)			41 (0x48)		3	0x3F	0x *
Nip Incr	60 (0x45)			40 (0x47)			40 (0x49)		4	0x4D	0x *
BrOfEarly	50 (0x4A)			40 (0x4B)			46 (0x4C)		5	0x4E	0x *
BrOn Delay	1 (0x4F)			1 (0x62)			1 (0x63)		6	0xFF	0xFFFF
TUStartDly-Pl	0 (0x4D)									0xFF	0xFFFF
IfdCstDly-Pl	10 (0x4E)										
S-Feed Spd-Pl	* (0x2D)										

12 Mil Plate	Offset	Value
T-UpStepDurSh	(0xB9)	46
T-UpStepDurLo	(0xBA)	60
T-DnStepDurSh	(0xBB	48
T-DnStepDurSh	(0xBC)	60
T-DnStartPtSh	(0xBD)	95
T-DnStartPtSh	(oxBE)	225
T-FeedCurLim	(oxBF)	50

* System dependent

NOTE: DSP numbers 0, 1, 2, and 3 are set after executing the Avdiag "Carriage Align" test. DSP numbers 4 and 5 are set after executing the Avdiag "Feed Motor Cal" test.

OCP User Parameters

User Parameters

NOTE: To view the following parameters you must first down load the OCP user parameters. Refer to Section 3.3.4.3

Selecting User Params displays a dialog box that shows the current user parameter settings stored in the imagesetter. The parameters reside in OCP EEPROM. The software retrieves the parameters from EEPROM when this menu selection is made. New values can be written to the imagesetter by typing in a new value in the appropriate parameter. Listed below is a typical customer's User Parameters menu.

Parameter	No.	Value
Resolution	(02)	1200
Page Size	(03)	30000
Feed Default	(06)	15
Unit of Meas.	(07)	2
Output Device	(13)	0
Supp. Cass. No	(15)	1
Video Mode	(17)	0
Media Usage	(24)	5
Fast Scan Coord	(25)	0
Slow Scan Coord	(26)	0
XY Coord Opt	(27)	0
Interpage Spac	(45)	1
Feed/Cut Lead	(46)	17
Jobs Imaged	(48)	0
Supply Alarm	(49)	309
Output Alarm	(50)	500
Spindle Loaded	(51)	1
Spindle Selected	(52)	1
Optimiz. Mode	(53)	0
Dist. Punch/Image	(54)	1728
Auto Centering	(58)	0
Online Time-out	(59)	0
Align Cass State	(97)	0
Dist. to Cutter	(98)	0
Humidifier State	(99)	0
OCP Volume	(100)	2
Prev. Page Size	(101)	0
Spind. Punch Opt.	(102)	0
Viewing Angle	(103)	14
Lifemedia Limit	(105)	0
Small Feed Error	(106)	0
Large Feed Error	(107)	0

Plate Overlap	(108)	1080
PL-12 Rewind Lev	(109)	
Feed High Res	(63)	
Interpage High Res	(64)	
Feedcut High Res	(65)	
Plate Mode	(67)	

Cassette Parameters

The cassette parameters contain the customer settings for the five cassettes. Write new values to the imagesetter by simply typing in a new value in the appropriate parameter. Listed below is a typical Customers Cassette Parameters Menu:

Parameters	**No.**	**1**	**2**	**3**	**4**	**5**
Density 1200 DPI	(05)	220	873	840	175	175
Density 1800 DPI	(05)	175	462	460	175	175
Density 2400 DPI	(05)	150	300	404	175	175
Density 3600 DPI	(05)	115	190	200	175	175
Media Left	(08)	1902	2500	1809	1895	0
Media Type	(14)	1	1	1	1	1
Punch Enable	(22)	2	0	0	0	0
Media Width	(27)	64800	57600	57600	57600	57600
Media Thickness	(47)	4	4	4	4	4
Image Position	(66)	540	540	540	540	540

Operational Statistics

Selecting OP Stats displays a dialog box that shows the operational statistics stored in the imagesetter in OCP EEPROM. The software retrieves the parameters from EEPROM after the menu is selected. The operational statistic values can not be changed or cleared. A typical systems operational lifetime statistic menu is shown below.

Operational (Lifetime) Statistics

Cuts	:	147
Supply Punches	:	124
Takeup Punches	:	124
Media	:	7131 (in tenths of feet)
Takes	:	761
Spot Changer	:	162
Elapsed Uptime	:	2592:06 (Hr./Min.)

Firmware Revisions

Selecting Firmware Revs displays a dialog box that lists the firmware revision levels installed in the imagesetter currently connected.

Avantra Firmware Revisions

DEC Firmware (K4/K1 FlashROM	:	*
DSP Firmware (DEC FlashROM)	:	*
OCP Firmware (OCP FlashROM	:	*
OCP Download (OCP EEPROM)	:	*
Diagnostic Firmware (C9)	:	*
Correction Table Version-Type	:	*
Bridge/OLP (OLP FlashROM)	:	*

* The revision levels change from release to release.

Display Error Log

Selecting Error Log displays a dialog box that shows a scrolling list of errors logged in the imagesetter. The error log contains the last 64 errors (both boot and application) encountered by the system. If the system supports real-time clock then only the last 30 errors will be displayed. The error codes are in DEC EEPROM. The software retrieves the error log from EEPROM upon entering this menu selection. Clear the error log by pressing ALT C. A typical error log is shown below.

AVANTRA ERROR LOG

Index	Error	Date*	Time*	Description
000	037	11-21-96	10:16	Output Cassette Jam/Blocked Sensor
001	01	11-07-96	15:50	Carriage Jam

* If the system does not support real-time clock then the Error Log will display “Media” instead of date and time.

Display Sensors

The Display Sensors menu item actively monitors the state of all sensors and switches in the imagesetter. With this menu, the user activates or deactivates a sensor and monitors the state of the sensor on the display (e.g., moving a jam wheel causes the state of the sensor to display on and then off as the wheel moves through the sensor). This utility aids in troubleshooting sensor problems in the system. Below is a typical Engine (imagesetter) Sensor Display screen.

Engine Sensor Display - Press ‘q’ to Quit

				Bridge/Buffer
(0,0) Humidity...............................		(1, 0) Supply Punch Punch.......		(0, 0) TSCREWOFF......
(0, 1) Flapper B-Load...................		(1, 1) Supply Punch Clamp.......		(0, 1) SLACKLOOP......
(0, 2) Supply Jam Wheel.............		(1, 2) Supply Cass. Selected B		(0, 2) BRPURCH...........
(0, 3) Flapper B-Image.................	ON	(1, 3) Door Interlock Left...........	ON	(0, 3) SHTTLELT...........
(0, 4) Door Interlock Right............	ON	(1, 5) Supply Media Present....	ON	(0, 4) SHTTLEHVY........
(0, 5) Supply Cass. Selected A.....	ON	(3, 0) Takeup Punch Punch.......		(1, 0) BRDGDOWN.......
(2, 0) Takeup Jam Wheel.............	ON	(3, 1) Takeup Punch Clamp.......		(1, 1) BUFENTRY..........
(2, 1) TKUP Cass. Pres. 1 Wide...		(3, 2) Takeup Cutter.................	ON	(1, 2) BUFPURCH.........
(2, 2) Flapper A-Load...................		(3, 3) Carriage Home................		(1, 3) BUFTOBRDG......
(2, 3) Takeup Cass. Core.............		(3, 5) Takeup Media Present.....		(1, 4) BUFTOPROC......
(2, 4) TKUP Cass. Pres. 2-NARR		(4, 3) Spinner Overspeed.........		.
(2, 5) Flapper-A-Image.................	ON	(4, 3) Laser Good Sensor.........	ON	
(4, 0) Aperture Home..................	ON	(4, 6) Beam Compressor Home	ON	
(4, 1) Polarizer Home....................				
(4, 2) Focus Home........................				

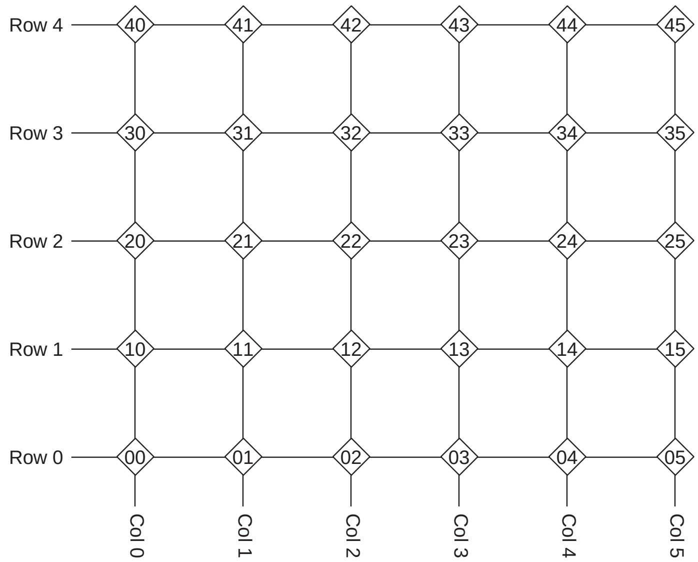


Figure 3-1 Avantra sensor grid.

RowCol 00 = Humidity
RowCol 01 = Left flapper load (down) sensor
RowCol 02 = Supply jam detector
RowCol 03 = Left flapper image (up) sensor
RowCol 04 = Right side door interlock switch
RowCol 05 = Supply spindle A position sensor
RowCol 10 = Supply punch (punch) switch
RowCol 11 = Supply punch (clamp) switch
RowCol 12 = Supply spindle B position sensor
RowCol 13 = Left side door interlock switch
RowCol 14 = Spare
RowCol 15 = Suppply side media present sensor
RowCol 20 = Take-up jam detector
RowCol 21 = Take-up cassette present sensor (36”)*
RowCol 22 = Right flapper load (down) sensor*
RowCol 23 = Take-up cassette core sensor
RowCol 24 = Take-up Cassette present sensor (18”)
RowCol 25 = Right Flapper image (up) sensor
RowCol 30 = Take-up punch (punch) switch
RowCol 31 = Take-up punch (clamp) switch
RowCol 32 = Take-up cutter home
RowCol 33 = Carriage home sensor
RowCol 34 = Spare
RowCol 35 = Take-up media present sensor
RowCol 40 = Spot size changer (aperture) sensor
RowCol 41 = Polarizer home sensor
RowCol 42 = Weak lens (focus) home sensor
RowCol 43 = Spin overspeed signal feedback
RowCol 44 = Laser good signal feedback
RowCol 45 = Beam compressor home sensor

NOTE: The current state of a sensor is determined by clearing the row and reading the column.

Carriage Motion

This item moves the carriage in the same manner as it operates during imaging. The Carriage Motion Menu appears as follows:

Spinner On	Spinner Off
Carr. Home Pos. (EEPROM)	863
Home Carriage	
Carr. Slew to Position	0
Image Start	0
Image End (EOT)	0
Carr. Image to Position	
Abort Carriage Movement	
Video Mode	0
Resolution (Image Speed)	3600
Gate Start (Pixels)	0
Gate Length (IN.)	25

These are the carriage motion menu functions.

Menu Item	Function
Spinner ON/OFF	Turn the spinner on/off.
Carriage Home Position	Set the carriage home position.
HOME Carriage	Move the carriage to the home position.
Carriage Slew to Position	Move the carriage to position at slew speed.
Image Start	Set the starting position for carriage motion at image speed.
Image End (EOT)	Set the ending position for carriage motion at image speed.
Carriage Image to Position	Move the carriage to position at image speed.
Abort Carriage Movement	Abort the carriage motion.
Video Mode	Set the video mode to positive/negative.
Resolution (Image Speed)	Set the imaging speed of the carriage (resolution).
Gate Start	Set the start of beam on.
Gate Length	Set the fast scan size of the image.

Feed Motor Cal

The “Feed Motor Cal” test calibrates the speed of the Supply Drive Servo Motor to the speed of the Take-up Nip Drive Servo Motor. The media and supply cassettes must be removed prior to performing this test. The two values will be stored in the DEC. DSP/Plate menu in DSP address location 4 and 5.

This test should be performed after replacing either servo motor or supply/take-up SDM boards

Imagesetter Primitives

This menu item executes imagesetter primitives usually executed by commands sent between micro-controllers via the SPI communication link.

Menu Item	APIS Command
Get Status	{MXSS}
Abort	{MXDS0180}
Shut Down Media	{MXDS0181}
Supply Feed	{MXDS0184}
Image Feed	{MXDS0185}
Reverse Feed	{MXDS019F}
Supply Torque ON	{MXDS0196}
Supply Torque OFF	{MXDS0197}
Takeup Cut	{MXDS0189}
Open Nips	{MXDS018E}
Close Nips	{MXDS018F}
Get Sensors	{MXDS0199}
Head Punch HOME	{MXDS01A9}
Head Punch CLAMP	{MXDS01AA}
Head Punch PUNCH	{MXDS01AB}
Tail Punch HOME	{MXDS01A6}
Tail Punch CLAMP	{MXDS01A7}
Tail Punch PUNCH	{MXDS01A8}
Takeup Cassette Forward	{MXDS019D}
Takeup Cassette Align	{MXDS019C}
Takeup Cassette OFF	{MXDS019E}
Supply Cassette B Rewind	{MXDS01B0}
Supply Cassette A Rewind	{MXDS01B1}
Supply Cassette OFF	{MXDS01B2}
Go to Spindle B	{MXDS01A4}
Go to Spindle A	{MXDS01A5}
Spinner ON	
Spinner OFF	
Vacuum ON	{MXDS0187}
Vacuum OFF	{MXDS0188}
Beam Compressor In	
Beam Compressor Out	
Carriage Home	
Center Carriage	
Flapper Load	
Flapper Image	
Brushes - Down	
Brushes - Up	

Bridge Primitives

Used to test the bridge. The user must turn the bridge on before running any of the tests below. These tests were not designed to test the complete functionality of the bridge. The two sensors (entrance and exit) are not tested during any of the primitive tests.

.

Menu Item	Function
Bridge On	Turns Bridge On
Bridge Off	Turns Bridge Off
Bridge Abort	Aborts test being performed
Clear Error	Clears errors
Front Drive - Fast	Front drive system running in fast mode
Rear Drive - Fast	Buffer drive system running in fast mode
Rear Drive - Slow	Buffer drive system running in slow mode
Short Feed	
Shuttle ON-CW	Moves bridge to light mode
Shuttle ON-CCW	Moves bridge to heavy mode
Shuttle OFF	Turns shuttle motor off
Brake ON-CW	Applies brake to buffer rollers
Brake ON-CCW	Applies brake to buffer rollers
Brake OFF	Removes brake from buffer rollers
Carriage Import	Moves buffer carriage to home position (bridge) sensor
Carriage Export	Moves buffer carriage to processor sensor
Carriage OFF	Turns off buffer carriage
Carriage Home	Moves buffer carriage to home position (bridge) sensor

Utilities Menu

The utility menu contains various utility commands and functions used by the AVDIAG, such as reset commands, imagesetter configuration, port configuration, and modem utilities. The following describes each menu selection.

New Engine/Restart

This menu selection prepares an imagesetter to respond to diagnostic commands. After this item is selected, an Enter Service Mode 1 Command is issued, which requests firmware revisions and imagesetter configuration information. This is useful when an imagesetter has been reset or a new imagesetter has been connected.

Soft Reset

This menu selection issues a Soft Reset Command {MXRE} to the imagesetter. The imagesetter saves all OCP EEPROM values changed since last power-up, resets, and initiates the boot sequence. The AVDIAG awaits a ready condition from the imagesetter (XMG02}, which signals that the boot completed. Issue a New Engine/Restart command after a reset to prepare the imagesetter for diagnostic commands. This is the preferred reset since it is non-destructive to EEPROM values that may have changed.

Hard Reset

This menu selection issues a hard Reset command A to the imagesetter. The imagesetter immediately resets (will not save OCP EEPROM values) and initiates its boot sequence. The AVDIAG awaits a ready condition from the imagesetter (XMG02}, which signals the boot completed. A New Engine/Restart should be issued after a reset to prepare the imagesetter for diagnostic commands. This is not the preferred reset since it is destructive. All OCP EEPROM values that changed since last power-up are lost (including Operational Stats). This command should be used as a last resort if all else fails and you can not make the imagesetter respond.

Reset Comm. Port

This menu selection resets the internal communication port of the PC. Try using this command if communication was lost between the imagesetter and the PC.

Config Comm. Port

This menu selection selects which communication port on the PC to use when communicating to the imagesetter. The choices are:

COM1-NONE,

COM1-XON/XOFF

COM2-NONE

COM2-XON/XOFF

or the internal CGEN Serial Port ATMSCC

Other communication ports are not supported (i.e., com3 or com4).

Modem Functions

This menu selection brings up a dialog box with a list of modem functions performed by the AVDIAG:

Dial-out	This item initiates a dial-out sequence.
Hang Up	This item causes the modem to drop the carrier and disconnect. It uses the hang-up string defined in the modem command strings.
Modem Command Strings	This item modifies the default modem strings such as the dial-out, modem initialization and hang-up strings. Modem command strings: *Dialprompt = FALSE Modeminit = AT Dialout = ATDT Hangup = ATH *Set to TRUE to get the PC to simulate a remote center PC.

Edit Phone File	This item enters a new phone number or modifies an existing number located in the AVDIAGs phone file. The phone file is a small database of names and phone numbers used by the AVDIAG when dialing out.

NOTE: After entering the customer's name, you must space over (not tab over) to the fortieth character position and enter the # symbol before entering the phone number.

Set Engine Phone #	This item programs a remote modem (imagesetter) NVRAM phone number to dial out (ATDS1).

Monitor Mode

This menu selection places the system in a special mode where direct entry of modem commands can be executed. It is also used to monitor boot progress after the imagesetter has been reset.

Execute PC Imager

NOTE: For this function to work properly, first launch the PC Imager program to the PC and execute (AVDIAG) from that program's utility menu (see the PC Imager User Guide. If you launch (AVDIAG) first, the system will not go online when you execute the PC Imager to run copy.

This menu selection temporarily exits the AVDIAG program and starts (spawns) the PC imager. After using AVDIAG, exit and control will return to the PC imager program.

Edit File

Selecting Edit File allows a text file to be edited using the DOS editor without exiting the AVDIAG program. When edit file is selected, a dialog box appears with prompts for entering a filename to edit. Type in the desired filename and press ENTER. Note that the entire path must be specified as shown in the following example:

Filename?
cmd\imgfeed.cmd

The DOS editor starts and loads the file selected. If the filename is not known or you wish to create a new file, press ENTER at the dialog box. The DOS editor starts without loading a file.

Set Config Passwd

This menu selection changes the imagesetter password. The user is asked for the original password before allowing a new password to be entered.

Toggle Comm. Display

Selecting this menu item enables or disables the monitoring of the APIS commands to and from the AVDIAG program. This mode is usually used in program debugging mode.

Feed/Error Disable

This menu selection allows the user to disable both film feeding and error reporting.

.

Menu Item	Function
ERROR Disable	Disables error reporting
FEED Disable	Disables Feeds
BOTH Disable	Disables both feed and error reporting
BOTH Enable	Enables both feed and error reporting

Set Real-Time Clock

Use this menu to Set Real-Time Clock. It first must be enabled in the “Engine Configuration” menu. If the system supports Real Time Clock then only the last 30 errors will be displayed.

Below is an example of the dialog box to set the Date and Clock.

Set Real-Time Clock
Month
Date
Year
Hour
Minute

FLASHROM

The download files should reside in a common subdirectory such as Download.

Prog DSP/CORR	Programs the DEC FLASHROM. Prior to programming the FLASHROM, the DEC DSP and the DEC CORR must be saved.
Prog OCP	Programs the OCP FLASHROM.
Prog DEC K1	Programs the DEC K1 FLASHROM.
Prog Bridge	Programs the bridge FLASHROM.
Get Blank ID	List Blank FLASHROMS.
Save DSP Code	Saves the DSP code section of the FLASHROM.
Save (CORR) Table	Saves the DEC correction table's section of the FLASHROM.

Exit

The Exit menu contains several modes for exiting the AVDIAG program.

Exit Modes

The following lists and explains the methods of exiting:

Exit	Exits the program immediately without any imagesetter reset.
Soft Reset......Exit	Causes the AVDIAG to first issue a soft reset (as described previously), await a ready condition from the imagesetter and then exit the program.
Hard Reset.....Exit	Causes the AVDIAG to first issue a hard reset (as described previously), await a ready condition from the imagesetter and then exit the program.
DOS shell	Allows the user to enter commands from the DOS prompt such as delete, copy, dir without exiting the AVDIAG program. After entering DOS commands, type exit to return to the AVDIAG program.

3.3.4 Save and Restore System Parameters

3.3.4.1 Save/Restore DEC Machine Parameters

Use this procedure to save DEC machine parameters to the PC or to restore DEC parameters from a PC back to the system. The parameters saved/restored reside in the DEC micro-controller's EEPROM and include:

- Image/Focus Parameters
- Media Parameters
- DSP Parameters

To Save:

1. Connect the PC to the diagnostic serial port of the system.
2. Turn the system on and allow the boot cycle to complete.
3. Launch the AVDIAG Program from your PC.
4. Under the ALIGN menu, select DEC Machine parameters and press ENTER.

   A message appears querying whether the machine parameters should be loaded. Press Y.

   The parameters load from the system into the PC's memory. A dialog box appears with a list of actions that can be performed.
5. Select Save to File and press ENTER.

   Another dialog box appears:

   Dec. Machine Parameters to be saved to a file.

   Select Y.
6. A dialog box appears for Pathname/Filename. Press ENTER.
7. The Pathname/Filename appears in the dialog box using the system's serial number and extension. Press ENTER.

   The machine parameters are saved.

To Restore:

1. Connect the PC to the diagnostic serial port of the system.
2. Turn the system on and allow the boot cycle to complete.
3. Launch the AVDIAG Program from the PC.
4. Under the ALIGN menu, select DEC Machine Parameters and press ENTER.

   If AVDIAG was relaunched, the following dialog appears:

   Loading Dec. EEPROM Machine Parameters into memory.
5. Select N in the dialog box and press ENTER.
6. Select Restore to Engine and press ENTER.
7. A dialog box appears with all the saved DEC files. Select the file with the same serial number and extension saved in Step 7 in the save procedures above and press ENTER.

   The Machine parameters will now load to the imagesetter. When completed, the following dialog boxes appear:

   Dec. EEPROM Machine Parameters have been restored to the engine.
8. Values will not take effect until the imagesetter is reset. Select Y and wait for the imagesetter to reset.

3.3.4.2 Save/Restore DEC DSP and DEC Correction Tables (DEC FLASHROM)

Use this procedure to save DEC DSP and DEC correction tables or to restore them to the DEC FLASHROM.

To Save:

1. Connect the PC to the diagnostic serial port of the system.
2. Turn the system on and allow the boot cycle to complete.
3. Launch the AVDIAG Program from your PC.
4. Select FLASHROM and then Save CORR table.
5. A dialog box appears for Pathname/Filename. Press ENTER.
6. The Pathname/Filename appears using the system serial number and extension. Press ENTER.

   The DEC correction tables will be saved to the PC.

   NOTE: If you have previously saved the DEC (DSP) software or have a newer revision, store in AVDIAG, then you do not have to save it again.

7. Select FLASHROM and then Save DSP code.
8. A dialog box appears for the Pathname/Filename. Press ENTER.
9. The Pathname/Filename appears. Press ENTER.

   The DEC DSP is saved to the PC.

To Restore:

1. Select FLASHROM and then Prog DSP/CORR.
2. Select RAW.
3. Select the filename saved in Step 9.

   This was the DSP file saved in the save procedures above.
4. Select the correction table for this system that was saved in Step 6 above.

   A dialog box appears with the two files previously selected to be downloaded to the DEC FLASHROM.
5. If the files are the correct ones for this system, press ENTER.

   The system erases the DEC FLASHROM and loads the two files selected:
   - DSP code
   - Correction Table
6. When the load completes, press any key and wait for the Avantra to reset.

3.3.4.3 Save/Restore Operator's Control Panel (OCP) User Parameters

Use this procedure to save OCP user parameters to the PC or restore OCP user parameters from a PC back to the system. The parameters being saved/restored reside in the OCP micro-controller's EEPROM and include:

- User parameters
- Cassette parameters
- Operational statistics

To Save:

1. Connect your PC to the diagnostic serial port of the system.
2. Turn the system on and allow the boot cycle to complete.
3. Launch the AVDIAG Program from your PC.

4. Under the ALIGN menu, select OCP User Parameters and press ENTER.

   A dialog box appears:

   Loading OCP EEPROM User Parameters and OCP EEPROM Cassette Parameters into memory.

   Select Y in the dialog box.

   The OCP parameters load up to the PC.

5. When the load completes, select Save to File.

   A dialog box appears:

   OCP EEPROM User and Cassette Parameters to be saved to a file.

   Select Y in the dialog box.

6. A dialog box appears for Pathname/Filename. Press ENTER.

7. The Pathname/Filename appears in the dialog box using the system serial number and extension. Press ENTER.

   The OCP user and cassette parameters are saved to a file.

To Restore:

1. Connect your PC to the diagnostic serial port of the system.
2. Turn the system on and allow the boot cycle to complete.
3. Launch the AVDIAG Program from your PC.
4. Under the Align menu, select OCP User Parameters and press ENTER.

   A dialog box appears:

   Loading OCP EEPROM User Parameters and OCP Cassette Parameters into memory.

5. Select N and then Restore to Engine.
6. A dialog box appears with all the saved OCP files. Select the file with the same serial number and OCP extension saved in Step 7 in the save procedures above.
7. The OCP User and Cassette Parameters will be restored to the imagesetter. When the process completes, a dialog box appears:

   Values will not take effect until engine reset.

   Select Y and wait for imagesetter to reset.

3.3.4.4 Program OCP FLASHROM

Use this procedure to load the OCP software from a PC into the OCP's FLASHROM. The software to be loaded must reside in the Download directory in the PC.

NOTE: Prior to programming, the FLASHROM is automatically erased.

1. Connect your PC to the diagnostic serial port of the system.
2. Turn the system on and allow the boot cycle to complete.
3. Next, launch the AVDIAG Program from your PC.
4. Under the FLASHROM menu, select Prog OCP and press ENTER.
5. Select RAW and then the latest OCP revision software file.
6. Press ENTER.

   A dialog box appears:

   The following file has been selected to download to the OCP FlashRom.

   Select Y in the dialog box.

   The control panel should go blank then flash during the the control panel FLASHROM erasure. In the top left corner of the control panel you should see the S records being sent over from the PC once the erasing process completes. When completed a dialog box appears:

   Press any key to continue.
7. Press a key and wait for the system to reset.

3.3.4.5 Program K1 FLASHROM

Use this procedure to load the DEC. K1 firmware from a PC into the DEC. K1 FLASHROM. The software to be loaded must reside in the Download directory in the PC.

NOTE: Prior to programming, the FLASHROM is automatically erased.

1. Connect your PC to the diagnostic serial port of the system.
2. Turn the system on and allow the boot cycle to complete.
3. Launch the AVDIAG Program from your PC.
4. Under the FLASHROM menu, select Prog DEC. K1 and press ENTER.
5. Select RAW and then the latest DEC. K1 firmware revision.
6. Press ENTER.

   A dialog box appears:

   The following file has been selected to download to the K1 FlashRom.

   Filename

   Select Y in the dialog box.

   The system erases the DEC. K1 FLASHROM and loads the new K1 software. When completed a dialog box appears:

   Press any key to continue.
7. Press a key and wait for the system to reset.

3.3.4.6 Program Bridge FLASHROM

Use this procedure to program the Bridge FLASHROM firmware from a PC into the bridge's FLASHROM. The software to be loaded must reside in the Download directory in the PC.

NOTE: Prior to programming, the Bridge FLASHROM is automatically erased.

1. Connect your PC to the diagnostic serial port of the system.
2. Turn the system on and allow the boot cycle to complete.
3. Next, launch the AVDIAG Program from your PC.
4. Under the FLASHROM menu, select Prog Bridge and press ENTER.
5. Select RAW and then the latest Bridge revision software.
6. Press ENTER.

   A dialog box appears:

   The following file has been selected to download to the Bridge FlashRom.
   Filename

   Select Y in the dialog box.

   The system erases the Bridge FLASHROM and loads the new Bridge software. When completed a dialog box appears:

   Press any key to continue.

7. Press a key and wait for the system to reset.

3.3.4.7 Creating Correction Tables

The Avantra has twelve Correction Tables. Ten of the twelve tables are identical for all Avantras (Avantra 20/25, Avantra 36/44, Avantra 36S/44S, and Avantra 30).

The two tables that are different for each system are the Density Variation (DQ) files and the Linearity (L) files. The ten identical tables are called "Default Correction Tables". They are on the same program disk as the "DSP" main program. Examples of some names for the Default Correction Tables are:

File Name	Systems
cor_12S.hex	Avantra 20/25 (DEC. B) boards
cor_12CS.hex	Avantra 20/25 (DEC. C) boards
cor_34S.hex	Avantra 36/44
cor_34HS.hex	Avantra 36S/44S
cor_30HS.hex	Avantra 30
cor_12HS.hex	Avantra 25S

These Default Correction Tables, with the Density Variation and Linearity files, contain all the information to make up the Correction Table for each of the Avantra systems.

Manufacturing runs two files (a “Density Variation” file and a “Scale” file) which merge with the “Default Correction Table” file to create the unique “Correction Table” for that system. To merge the “DQ” and “L” files to the Default Correction Table, use a program in the “Correction Utility” disk.

There are four “DQ” files (one for each resolution) and two “L” files that make up the “DQ” and “L” tables. These files are shipped with each system in the system diskette along with the Correction Table file for that system.

When a new carriage assembly is shipped a diskette is included, containing a new correction table for that carriage. This Correction Table is loaded down to the system after a new carriage assembly is installed. That new carriage system diskette also includes the new “DQ” and “L” files for that carriage.

If the correction table on the disk becomes corrupted you can use the “DQ” and “L” files to make up another Correction Table. Also, if there is a problem with the linearity you can send back a “scale” file with the appropriate parameters set so that we can measure it and send you back a new diskette with just the new “L” files. This is usually done when a spin motor is replaced.

It is very important that when a carriage assembly is replaced that the new Correction Table plus the “DQ” and “L” files are replaced on the original system diskette. The same is true if just new “L” files are sent to correct Linearity problems. The new correction table that was made with the new “L” files should be copied to the original system diskette.

Creating a New Correction Table

To create a new Correction Table you must have certain software programmed into your PC. The new Correction Table is built in your PC and must be merged with the correct “DSP” main program and downloaded to the Avantra. The following programs must be loaded in your PC before creating a new Correction Table:

- The latest version of the Correction Utility program.
- The Default Correction Table for that system.
- The new “DQ” and “L” files on floppy disk. The file names must include the system serial number.
- The “DSP” Main program for that system.

NOTE: You must rename the “DQ” & “L” files with the system serial number. If this isn’t done the Correction Utility will still create a Correction Table but without the new “DQ” & “L” files. If the system serial number is 222 then an example of a renamed “DQ” & “L” file is (DQ00222H.001) and (L00222H.003). The serial number must be five digits, include leading zeros if necessary.

1. Insert the floppy disk with the new “DQ” and “L” files into your PC floppy drive. Once you launch the program you will be asked three questions:

    1. Serial number of the system.
    2. Supported Engine Type. (What engine are you creating this correction table for?)
    3. Version Number of the Correction Table.

2. To create the new Correction Table type the Avdiag directory name that you installed the software in your PC. Do not launch the program from Avdiag. For our example we will use the Avantra directory.

C:\Avantra> corrutil.exe -ia:

NOTE: Use -ib: if floppy is in “B” drive of your PC.

This message displays on the PC:

Avantra Corrutil Version 3.06

NOTE: The Version number may change depending on the version of the Correction Utility program loaded in your PC.

3. Enter the machine serial number (leading zeros not needed).

4. Enter the engine type, from the table below:

1	Avantra - 25 @ 20K	(for AV20/25 with DEC. “B” boards).
2	Avantra - 36/44 @ 13.5K	(for standard AV36/44 systems).
3	Avantra - 25revC @ 20K	(for AV20/25 with DEC. “C” boards).
4	Avantra - 30 @ 20K	(no AV30s with 20K spin motors).
5	Avantra - 30 @ 30K	(AV30 with 30K spin motors).
6	Avantra - 36/44 @ 20K	(for Avantra 36/44 “S” systems).
7	Avantra - 25 @ 30K	(for Avantra 25 “S” systems).

These messages will appear on the PC:

PROCESSING DENSITY FILES
Using program defaults fit constraints
Using program defaults correction coefficients

OK to delete existing D-files? (Y/N)

5. Type “Y”

NOTE: This will only appear if there are “D” files on the floppy disk. The new “DQ” files will create new “D” files).

This information will appear on the PC:

Processing input file a:\dqxxxxxh.001
Largest fit error is x.xxxxxx.
Created output file a:\dxxxxxh.001
Processing input file a:\dqxxxxxl.001
Largest fit error is x.xxxxxx.
Created output file a:\dxxxxxl.001
Processing input file a:\dqxxxxxh.007
Largest fit error is x.xxxxxx.
Created output file a:\dxxxxxh.007
Processing input file a:\dqxxxxxl.007
Largest fit error is x.xxxxxx.
Created output file a:\dxxxxxl.007

Initializing from INIT c:\avantra\download\cor_xxxx.hex

NOTE: Note: The cor_xxxx.hex is the Default Correction Table for the system you are creating the new correction table for.

INIT_HEX version is xx.xx
(Version number of correction table).
Processing table: a:\dxxxxxh.001
Processing table: a:\dxxxxxl.001
Processing table: a:\lxxxxxh.003
Processing table: a:\lxxxxxl.003
Processing table: a:\dxxxxxh.007
Processing table: a:\dxxxxxl.007
Enter #.# to revise version #; Return to retain:

NOTE: Press “Enter” to keep the version number.

The PC displays:

Writing COR_HEX: C:\avantra\download\corxxxxx.hex

NOTE: This writes a new Correction Table to your Avantra directory.

The PC displays:

Copy COR_HEX to a:? (Y/N)

6. Type “Y”. (This copies the new Correction Table to the “A” floppy drive in the PC).

NOTE: Please wait until the PC is finished coping the Correction Table to the floppy disk.

The PC displays:

Correction Table Completed.

Press any key to exit . . .

The new correction table which is now in your Avantra download directory must be merged with the correct “DSP” software using the “Prog DSP/CORR” in Avdiag FlashRom menu.

The new Correction Table plus the “DQ” & “L” files should be copied to your original system floppy diskette.

When you send in a scale file to be measured for linearity correction you will only receive the “L” files. You must copy the “DQ” files from the original system diskette to the diskette with the new “L” files. When completed you should have six files on the floppy disk before creating the a new Correction Table. The disk should contain the four “DQ” files from the original system floppy disk plus the two new “L” files.

3.4 Remote Diagnostics

This section describes the equipment requirements, modem configuration and procedures involved in making a remote connection to an Avantra.

3.4.1 Equipment Requirements

A remote connection to an Avantra requires the following equipment.

CAUTION: If equipment used to make the remote connection is other than that recommended, unpredictable results may occur.

Remote Site Equipment

Equipment	Part Number
Dolch PC (or equivalent)	78461-501
Modem: Zoom	80007-001*
Avantra Diagnostic Diskette (AVDIAG)	700594-1003**

*Modem and modem part numbers are subject to change.

**Refer to OMNI Bulletin Board for latest revision of AVDIAG.

Imagesetter Equipment

Equipment	Part Number
Modem: Zoom	80007-001*
Power Cable (DEC to Modem)	208880-503
9-Pin to 25-Pin Adapter cable	208881-501

*Modem and modem part numbers, and power cables are subject to change.

Avantra Modem Specifications

Data Rate:	2400 BPS or faster
Data Compression:	CCITT V.42BIS, MNP Class 5
Data Correction:	CCITT V.42, MNP Class 2-4
Compatibility:	CCITT V.42BIS/V.42/V.22BIS/V.22/V.21/
	V.29/V.27 Bell 212A, 103
Command Support	Hayes extended AT Command set
Operation:	Full or half-duplex
Dialing:	Pulse or Tone
Intelligence:	Auto-dial, auto answer, auto speed selection
Command Buffer	40 Characters
Memory:	Non-Volatile RAM, stores four (4) telephone numbers and 2 configurations of modem settings
Weight:	7.4 ozs. (210 grams)
Dimensions*:	4.9" x 2.7" x 1" (12.4cm x 7cm x 2.5cm)
Interface:	RS-232C
Telephone Interface:	RJ11
Receive Sensitivity:	- 43 dbm
Transmit Level:	- 12 dbm
Input Power	9VDC, 300 ma
Environment**:	32 to 133 (operating)
	-40 to 140 (non-operating)

*The dimensions are critical only if installation of the modem inside the Avantra is desired. The modem mounting bracket inside the system is sized to fit the above mentioned dimensions exactly.

**The electronics inside the Avantra (DEC PCB) provide a power source for a built-in modem. If a different power source is needed for a particular modem, an external AC to DC adapter will be required.

3.4.2 Hardware Configuration

This section describes the configuration for both the remote and local modems, as well as the interconnection of all necessary hardware.

Imagesetter Modem

Configuration:

The remote modem recommended is a GVC 2400BPS Fax/Modem, Model # FMM9696/24V. This unit has been extensively tested for correct operation in the Avantra. Other modems can be used, but correct operation cannot be guaranteed. Refer to Table 3-3 and Table 3-4 for detailed information on the modem configuration settings.

Table 3-3

COMMAND	DESCRIPTION
E0 Echo Off	V1Word Responses
&D0	Modem Ignores DTR Ready Signal
V1	Send Word (Vebose) Responses
\N3	Selects Auto-reliable Mode
\N0	Disables Auto-mode Detection; Connection Speed Specified by Registe S37.
&K0	Disables Flow Control
&Q5	FAX Modem Negotiates Error Correcting Connection

Table 3-4

REGISTERS	
S0=1Auto	Answer Enabled
S7=120	Wait Time for Remote Carrier (2 minutes)

To ensure proper operation of the modem, certain registers and non-volatile configuration parameters must be pre-set prior to installation. A PC or terminal is required to set these values. Table 3-2 lists the commands/registers that must be pre-set.

NOTE: Remote configuration of this modem is not supported. Configuration must be done at the time of installation. Other modems may support this feature. Refer to manufacturer's documentation.

After the modem has been configured, store the settings in the active configuration profile (usually 0) with the following command:

AT&W0

The remote diagnostic center's telephone number (for the auto dial-out feature) should now be entered into the modem's non-volatile RAM. Four telephone numbers can be stored in the modem's memory: 0 - 3. The Avantra's firmware uses only one specific location when dialing out: location 1 (ATDS=1).

Hardware Connection:

After configuring, install and connect the modem to the system. Follow these procedures:

1. Open the right bottom and top side doors. Locate the modem mounting bracket on the side of the electronics enclosure.
2. Remove the two (2) nuts securing the mounting clip on the modem bracket and remove the clip.
3. Slide the modem into the bracket with the connectors facing out. Re-install the mounting clip.
4. Locate the power and diagnostic port connectors on the DEC PCB (bottom of electronics enclosure).
5. Plug the DC power cable into the DEC and route the cables along the bottom of the door up to the modem.
6. Plug the power connector into the modem.
7. Connect the 25-pin end of the adapter cable to the diagnostic port on the DEC. Connect the 9-pin end of the adapter cable to the modem serial cable.
8. Route the serial cable along the bottom of the door up to the modem.
9. Plug the DIN connector into the modem.
10. Route the telephone cable (with RJ11 connector) through the cable access hole under the system. Continue to route the cable up the back of the system, over the cross brace and along the bottom of the door and up to the modem.
11. Plug the cable into the telephone jack marked LINE.
12. Turn the system on and depress the power switch on the modem to turn it on.

    Make sure that the Power On/Ready LED on the modem illuminates. The modem should now be ready for remote communication.

Local Modem

Configuration:

The recommended local modem connected to the PC is also a GVC 2400BPS Fax/Modem. If the remote and local modems are the same, command compatibility, data compression, and data correction features should operate properly. Other modems can be used but they must meet the requirements in Table 3-5 and Table 3-6.

Table 3-5

COMMAND	DESCRIPTION
E0	Echo Off
V1	Word Responses
&D0	Modem Ignores DTR Ready Signal
N0	Disables Auto-mode detection; Connection Speed Specified by Register S37
&K3	Enables RTS/CTS Flow Control
&Q5	FAX Modem Negotiates Error Correcting Connection
\N3	Selects Auto-reliable Mode

Table 3-6

REGISTERS	
S0=1	Auto Answer Enabled
S7=120	Wait Time for Remote Carrier (2 minutes)
S37=9	Desired DTE Connection Speed

After the modem has been configured, store the settings in the active configuration profile (usually 0) with the following command:

AT&W0

Hardware Connection:
After the modem has been configured, perform the following procedures:

1. Connect the 9-pin end of the modem serial cable to the appropriate serial port of the PC.

2. Plug the DIN connector into the modem.

NOTE: Depending on the PC used, a 9- to 25-pin adapter cable may be necessary to connect the modem cable to the PC's serial port.

3. Plug the telephone line into the modem jack marked LINE. If desired, plug the telephone into the modem jack marked PHONE.
4. Plug the power connector into the modem and plug the AC/DC adapter into an AC outlet.
5. Depress the power switch on the modem to turn it on.

   Ensure that the Power On/Ready LED on the modem illuminates. The modem should now be ready for remote communication.

3.4.2.1 Making the Remote Connection

The following describes a typical remote session:

1. Ensure that the proper modem configuration and hardware connections have been previously completed at the remote site (imagesetter).
2. Ensure that the proper modem configuration and hardware connections have been completed at the PC.
3. Make a voice connection to the remote site prior to any remote connection to the imagesetter. Call the customer on a telephone (other than the modem line) and inform them you would like to make a remote connection to the Avantra. Make sure that the system is turned on, that all jobs have been cleared from the drum, and that other users have been informed not to send jobs to the Avantra.
4. Turn on the PC and start the Avantra Diagnostic Program. Type:

   C:\avantra>avdiag
5. If the AVDIAG has been set up for remote communication on boot up, a dialog box with a list of phone numbers to dial appears. If AVDIAG has not been set up for remote communication, a time-out error appears several times before allowing access to the main menu.

   NOTE: Pressing ESC during this time aborts the retries.

   At this point, under Utilities, select Modem Functions then Dial-Out. The dialog box with the list of phone numbers to dial appears.
6. Select the desired phone number and press RETURN.

   The program begins the dial-out sequence.
7. After a connection has been made, press any key to continue.

   This dismisses the dialog box.
8. Enter service mode 1 and get the system configuration.

   NOTE: If the manual dial-out feature was used to connect, entering service mode will not be automatic. Select New Engine/ Restart under the Utilities menu to enter service mode.

9. Use the program to perform diagnostics, retrieve machine parameters, error logs, download new firmware etc.

3.4.2.2 Exiting the Remote Connection

After completing the diagnostic session, the remote connection must be terminated. Follow these procedures:

1. Complete or abort any operation currently under way.
2. Under EXIT, select the appropriate method of exiting.

   Unless otherwise specified, always exit with a soft reset. Click on the Exit with Reset button.

   NOTE: Resetting the system before exiting leaves the Avantra in a known (idle) state. This helps to avoid confusion and possible problems to the customer later.

3. After transmitting the reset {MXRE} command to the Avantra, the program issues a hang-up command to the modem. Make sure that the carrier detect LED goes out, signaling that the connection has been terminated.
4. Call the customer site on the voice line to inform them that the Avantra is back on line.

3.5 Vacuum System Troubleshooting Guide

The following is an aid to troubleshooting the Avantra 36/44 vacuum system. Refer to the troubleshooting chart in Figure 3-2 when working with the following procedures.

1. Turn the system on and allow the boot sequence to complete.
2. Using Avantra Diagnostics (AVDIAG), choose:
   a. Align
   b. Primitives
   c. Vacuum ON

   At this point, the vacuum pump should be running.
3. If the pump fails to operate, check that both adjustment screws on the volt sensing relay have been turned counterclockwise to MIN.

   Refer to Figure 3-3 snd Section 3.5.1, Volt Sensing Relay Adjustment Procedure below.

4. If the pump still fails to operate, check the vacuum pump fuse:

   a. Turn the system off, unplug it.

   b. Locate the fuse holder on the outside of the electronics box (see Section 4.8, Vacuum in Chapter 4, Imagesetter Component Removal/Replacement Procedure). Refer to Figure 3-3.

   c. Check the fuse with an Ohm meter and replace the fuse, if necessary.

   d. Plug the system in and turn the power on.

   e. If the new fuse blows, turn off and unplug the system.

   f. Locate and remove the electronics box (see Section 4.8, Vacuum in Chapter 4, Imagesetter Component Removal/Replacement Procedure). Locate the vacuum pump wires (brown and blue) inside and disconnect them.

   g. Install a new fuse, plug the system in, and turn it on.

   Continue to Step 5.

5. Using AVDIAG, choose:

   a. Align

   b. Primitives

   c. Vacuum ON

   d. Check the AC line going into the pump assembly. Using a DVM, measure the voltage across the following two points:

      Pin 2 (solid state relay) At 110 V ⇒ 110 V

      Pin 1 (volt sensing relay) At 220 V ⇒ 110 V

   A correct voltage reading indicates that a defective vacuum pump is the most likely problem. Remove the pump (see Section 4.8.1, Vacuum Pump in Chapter 4, Imagesetter Component Removal/Replacement).

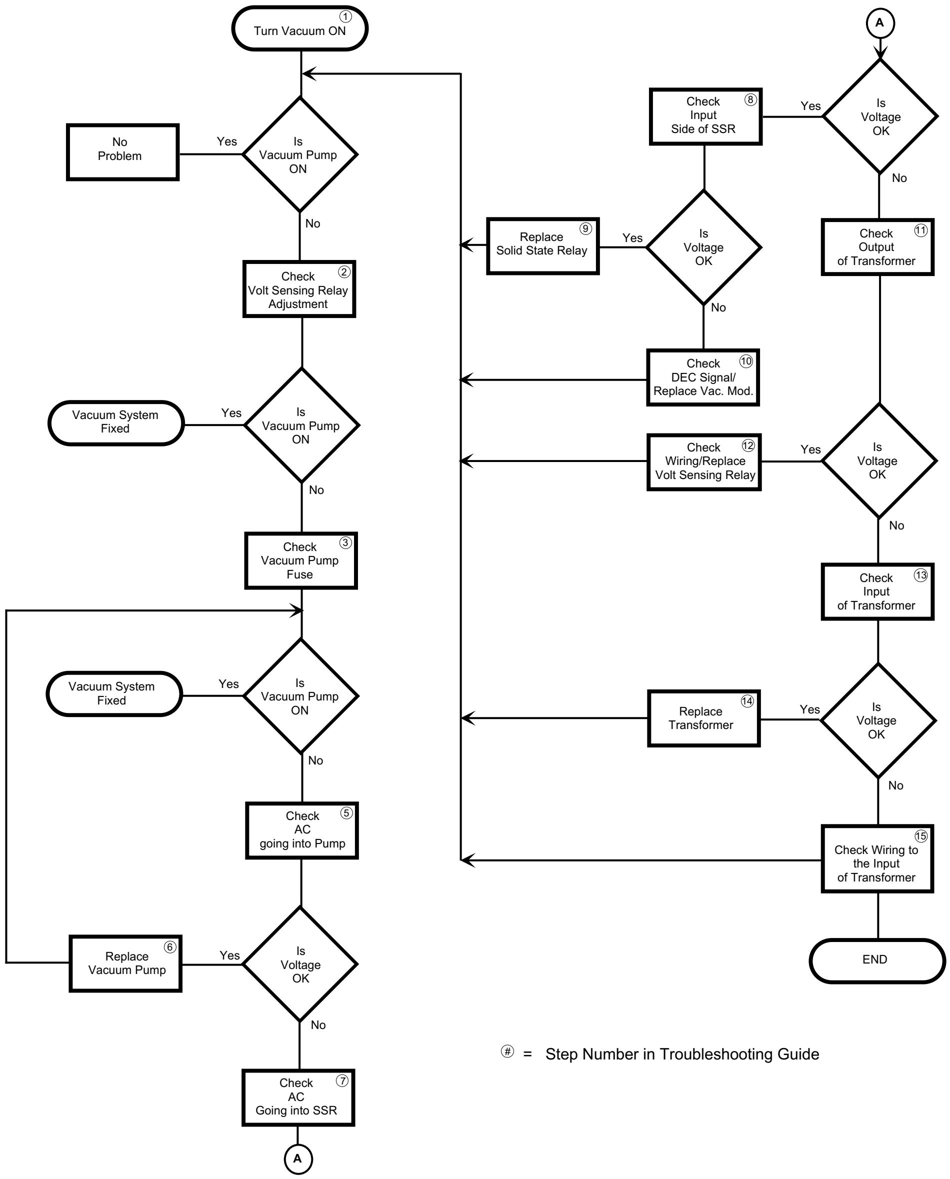


Figure 3-2 Vacuum system troubleshooting flowchart.

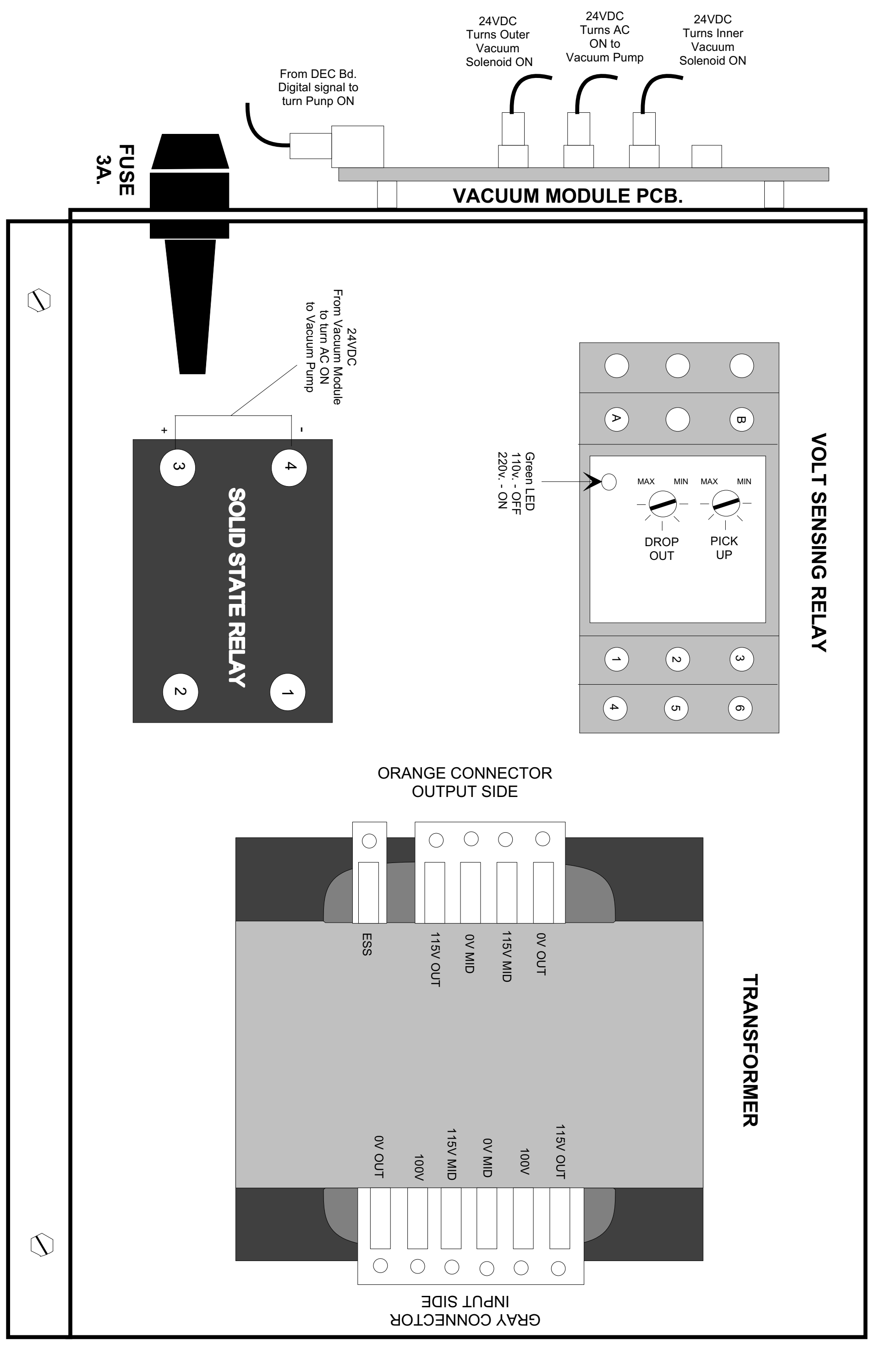


Figure 3-3 Transformer housing assembly.

6. If the voltage reading is wrong, check the voltage coming into the solid state relay (SSR). See Figure 3-3.

   a. Using a DVM, measure the AC voltage across the following two points:

      Pin 2 (solid state relay) At 110 V ⇒ 110 V

      Pin 1 (volt sensing relay) At 220 V ⇒ 110 V

   If the voltage reading is wrong, skip to Step 7.

   b. If the voltage reading is good, check the input side of the SSR. Using a DVM, measure the DC voltage across the following two points:

      Pin 3 (solid state relay) +24vdc

      Pin 4 (solid state relay) +24vdc

   c. If the DC voltage reading is good, a defective SSR is the probable cause. Replace the SSR.

   If the voltage reading is wrong, go to Step 7.

7. A bad DC voltage reading may indicate a defective vacuum module PCB or a problem with the digital signal from the DEC board.

   a. Check the output of the transformer using a DVM to measure the AC voltage across the following two points:

      0V Outside--Gray Conn At 110 V ⇒ 110 V

      115V Outside--Gray Conn At 220 V ⇒ 110 V

8. A good voltage reading may indicate a defective or miswired volt sensing relay. Replace the volt sensing relay if the wiring is correct.

9. If the voltage reading is wrong, check the transformer input. Using a DVM, measure the AC votage across the following two points:

   0V Outside--Gray Conn At 110 V ⇒ 110 V

   115V Outside--Gray Conn At 220 V ⇒ 220 V

10. A good voltage reading may indicate a defective transformer. Replace the transformer.

11. If the voltage reading is wrong, check the wiring to the transformer.

3.5.1 Volt Sensing Relay Adjustment Procedure

This procedure ensures that systems operating at 220V have vacuum power stepped down to 110V. which the vacuum pump requires.

To adjust perform the following steps:

1. Turn the system off and unplug it.

2. Locate and remove the electronics box at the bottom of the system (see Section 4.8, Vacuum in Chapter 4, Imagesetter Component Removal/ Replacement Procedure).

3. Locate the volt sensing relay. See Figure 3-3. Locate the green LED and two adjustment screws on top marked: PICK UP and DROP OUT.
4. Turn each adjustment counterclockwise to the MIN setting.
5. Plug in the system and, while monitoring the green LED on top of the volt sensing relay, turn the system on.

   If the operating line voltage is 110V, the LED will be off. If the line voltage is 220V, the LED will be on.
6. If the vacuum pump is not operating, continues to blow fuses, or the LED is not on at 220V refer to Section 3.5, Vacuum System Troubleshooting Guide.

NOTE: Make certain that the sytem's power switch is in the off position prior to plugging the system into the AC power source. This allows the volt sensing relay to sense the line voltage and to switch over before the digital signal turns the vacuum pump on.

Chapter 4:

Imagesetter Component Removal/Replacement Procedures

4.1 Introduction

This chapter describes the procedures for removing and replacing components in the Avantra 36/44 imagesetter.

Topics covered are:

- Covers
  - Right/Left Side Covers
  - Top, Middle and Bottom Front Panels
  - Electronic Enclosure Cover
- Media Transport Removal/Replacement Procedures
  - Take-up Light Shield
  - Outer Take-up Drive (Nip) Assembly
  - Inner Take-up Drive (Nip) Assembly
  - Inner Take-up Drive (Nip) Motor
  - Take-up Jam Sensor
  - Take-up Punch Assembly
  - Cutter Assembly
  - Cutter Motor
  - Take-up Media Present Detector
- Electrical Removal/Replacement Procedures
  - Digital Engine Controller (DEC) PCB
  - Carriage Sensor Driver (CSDM) PCB
  - Operator Control Panel Assembly
  - The Supply and Take-Up Sensor Driver Modules PCB (SDMs)
  - Power Supply
  - Main Power Switch
  - Exhaust Fan

    - Intake Fan
- Carriage Drive Removal/Replacement Procedures
    - Carriage Transfer Tool Installation
    - Carriage Assembly
- Opto-mechanical Removal/Replacement Procedures
    - Light Shields (Right and Left)
    - Spin Motor Module (SMM)
    - Spot Generation Module (SGM)
    - Spot Size Sensor
    - Polarizer Sensor
    - Beam Compressor Motor
    - Aperture Wheel Motor
    - Weak Lens Motor
    - Focus Sensor
- Media Transport Removal/Replacement Procedures
    - Supply Drive Servo Motor
    - Supply Cassette A or B Rewind Motors
    - Supply Spindle Select Motor
    - Supply Spindle Select A/B Sensors
    - Supply Roller Removal and Installation
- The Vacuum System
    - Vacuum Pump
    - Vacuum Valves
    - Vacuum Board

4.2 Covers

The following describes how to remove the covers and panels.

4.2.1 Right/Left Side Covers

Tools Required: None

Remove:

1. Open the top cover at the front of the imagesetter.

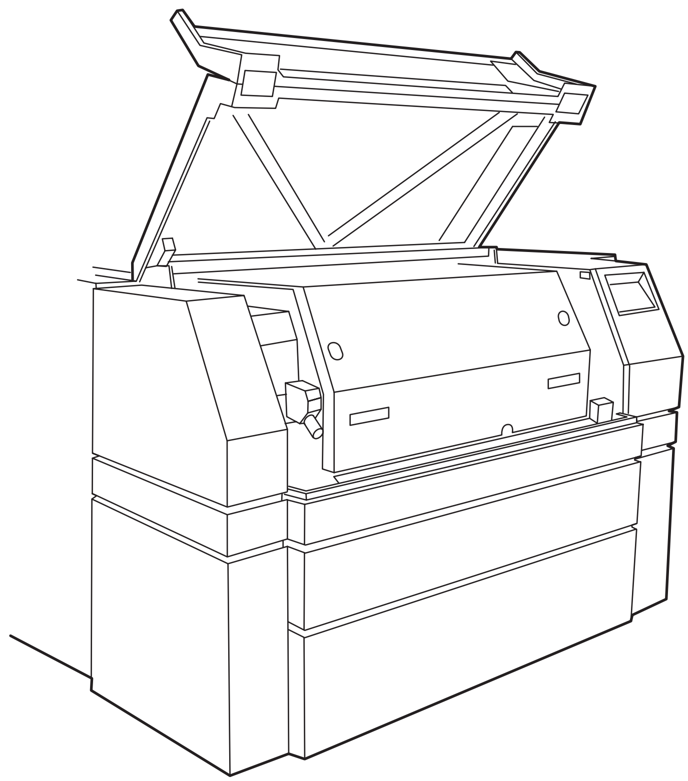


Figure 4-1 Imagesetter with front top cover open.

2. Loosen the thumb screw located on the inside of the imagesetter. Refer to Figure 4-2.

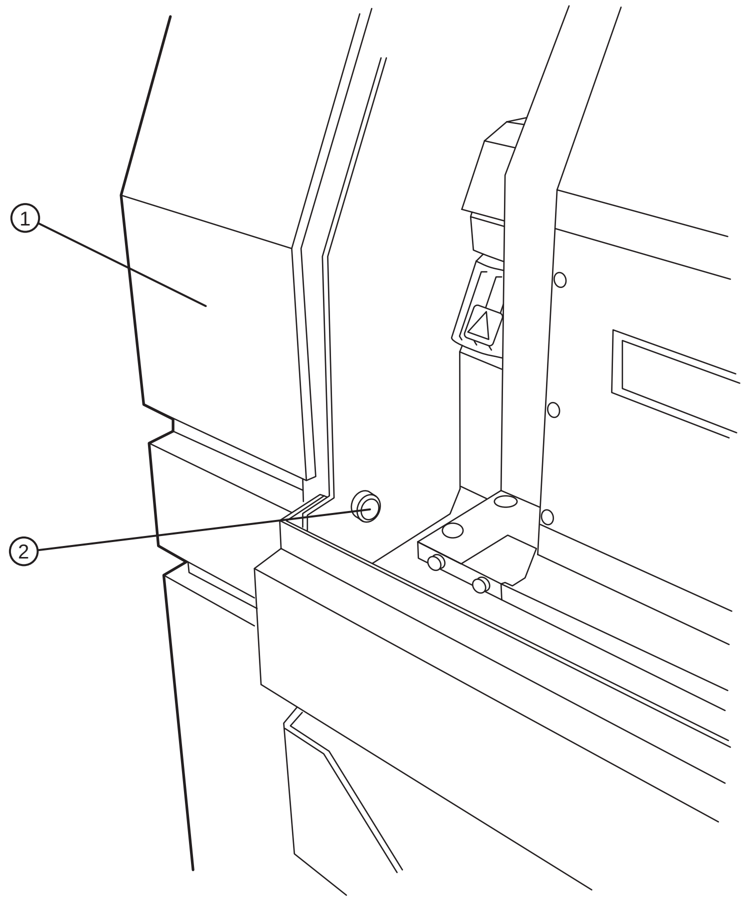


Figure 4-2 Thumb screw location.

①–Side Cover. ②–Thumb screw.

3. Swing the left or right side cover out at a right angle from the system.

Replace:

1. Reverse the above procedure.

4.2.2 Top, Middle and Bottom Front Panels

Tools Required: None

NOTE: The bottom panel is not normally removed.

Remove:

1. Lift the bottom segment of the top cover. Refer to Figure 4-3.

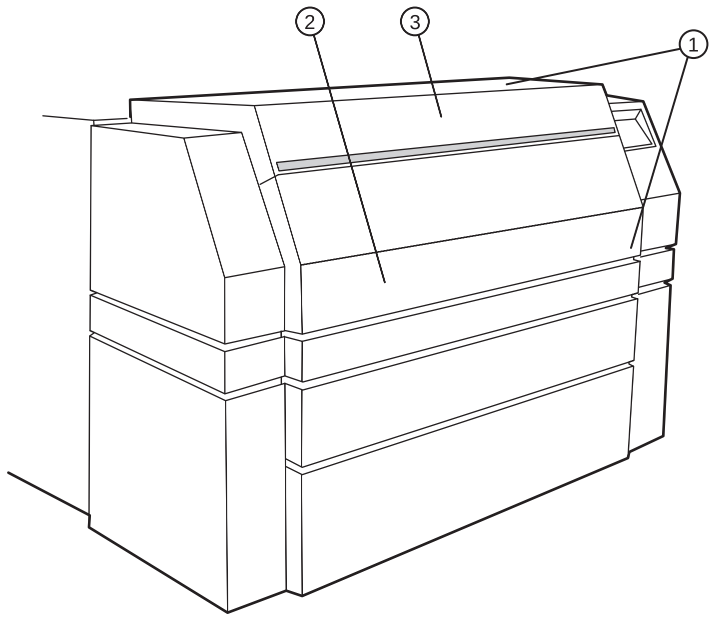


Figure 4-3 Front of imagesetter.

①–Front cover. ②–Bottom segment. ③–Top segment.

2. Lift the top panel up, releasing it from the lock slots on either side, and pull straight out. Refer to Figure 4-4.

.

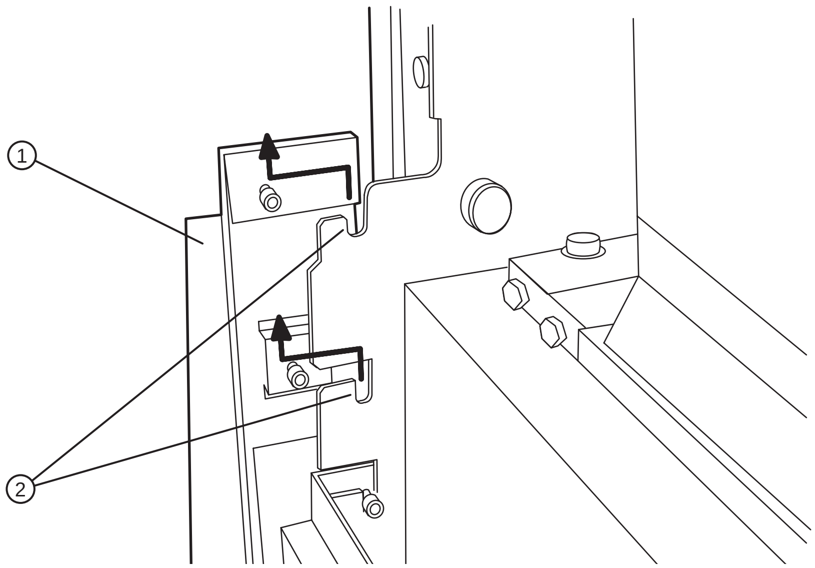


Figure 4-4 Top panel lock slots.

①–Top panel. ②–Top lock slots.

3. Do the same for the middle panel, being careful to clear it from its lock slots on the sides. Refer to Figure 4-5.

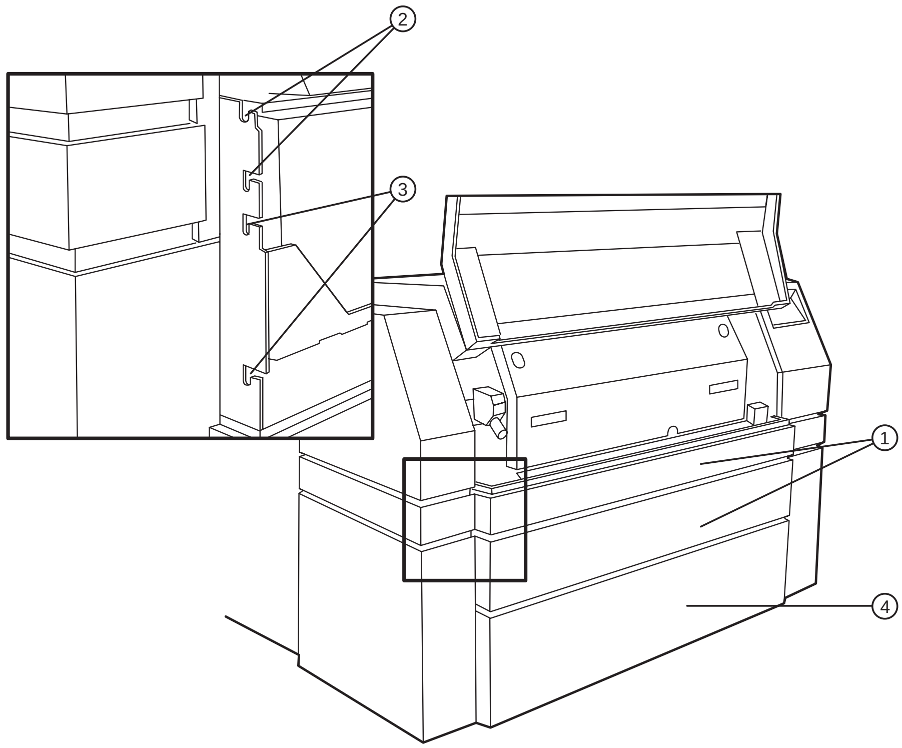


Figure 4-5 Middle panel lock slots.

①–Front panels (top and middle). ②–Top panel lock slots.
③–Middle panel lock slots. ④–Bottom panel.

4. To remove the bottom panel, grasp it at the bottom center, lift straight up and pull forward.

Replace:

1. Reverse the above procedures.

4.2.3 Electronic Enclosure Cover

Tools Required: 1/4" nut driver

Remove:

NOTE: The electronics enclosure is located inside the right side cover.

1. Open the right side cover. See Section 4.2.1, Right/Left Side Covers.
2. Remove the three (3) 1/4" hex screws at the bottom of the electronics enclosure. Refer to Figure 4-6.
3. While holding the electronics enclosure cover with one hand, loosen one (1) 1/4" hex screw located at the top right side. Refer to Figure 4-6.

NOTE: The screw also secures a cable clamp for the power supply cable going to the control panel.

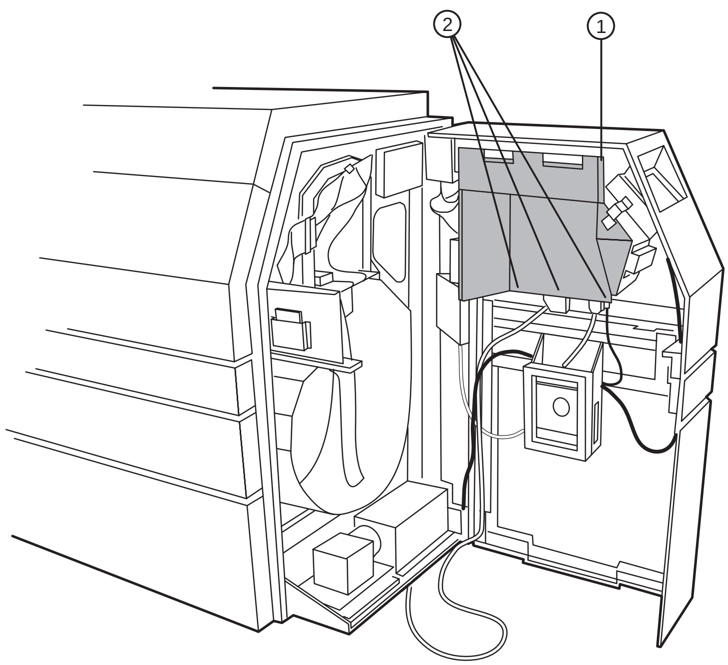


Figure 4-6 Electronic enclosure cover (screw locations).

①–1/4" hex screw. ②–Three 1/4" hex screws.

4. Slide the electronics enclosure down and remove it from the system.

Replace:

1. Reverse the above procedure.

4.3 Media Transport Removal/Replacement Procedures

The following describes the media transport removal/replacement procedures.

4.3.1 Take-up Light Shield

1. Raise the front top cover.
2. Remove the top and middle panels. See Section 4.2.2, Top, Middle and Bottom Front Panels.
3. Loosen the three thumb screws at the bottom of the light shield. Refer to Figure 4-7.
4. Grab the shield by the handles. Refer to Figure 4-7. Pull out, then up.

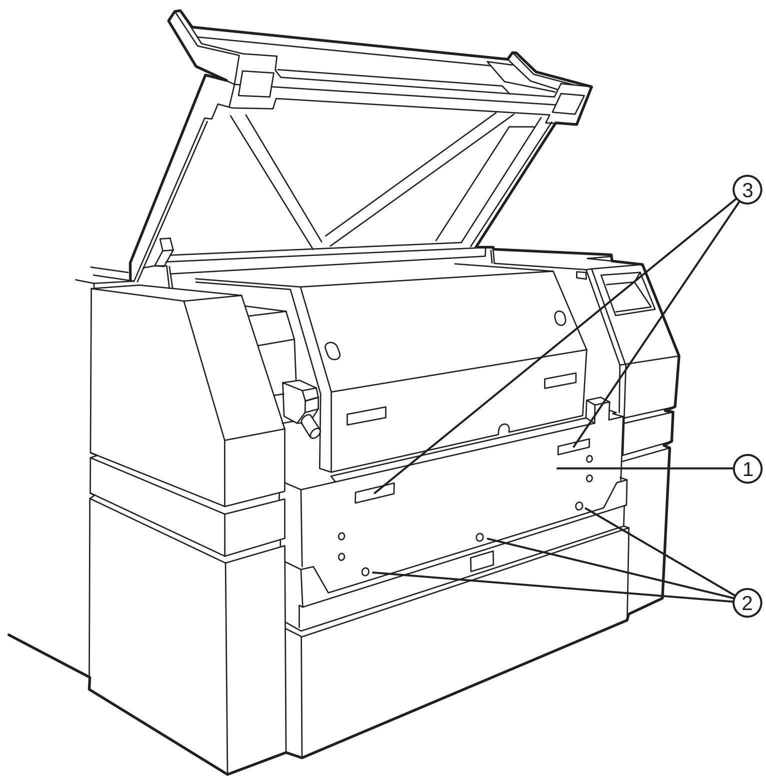


Figure 4-7 Take-up light shield.

①–Take-up light shield. ②–Three thumb screws. ③–Handles.

4.3.2 Outer Take-up Drive (Nip) Assembly

Tools Required: Flathead screwdriver

Remove:

1. Unload the media and turn the system off.
2. Open the top cover.
3. Remove the top and middle front panels. See Section 4.2.1, Right/Left Side Covers.
4. Remove the take-up light shield. See Section 4.3.1, Take-up Light Shield.
5. Remove the foam on either side of the outer take-up (nip) drive.
6. Disconnect the nip solenoid connector. Refer to Figure 4-8.
7. Disconnect the cutter interlock switch cable. Refer to Figure 4-8.
8. While holding the nip assembly with one hand, use a flathead screwdriver to loosen the four (4) screws on the front of the assembly. Refer to Figure 4-8.
9. Remove the assembly from the system.

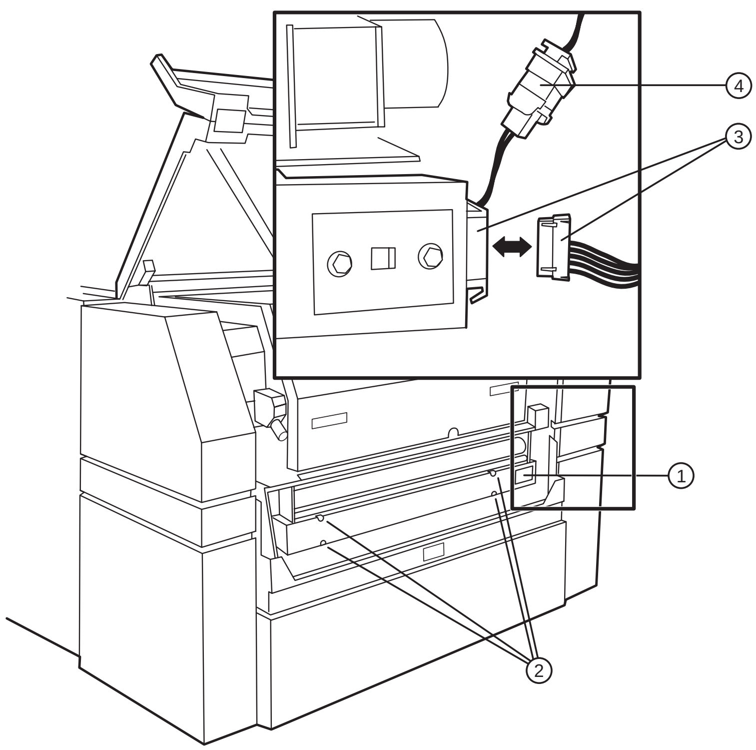


Figure 4-8 Removing the outer take-up drive assembly.

①–Outer take-up (nip) assembly. ②–Four screws. ③–Nip solenoid connector. ④–Cutter interlock switch cable.

Replace:

1. Reverse the above instructions to re-install the outer take-up drive assembly.
2. The take-up drive assembly should be checked for proper operation before the outer covers are installed.
3. After installing the outer take-up drive assembly and light shield, turn the system on and launch the AVDIAG program from your PC.
4. Select ALIGN and select Engine Primitives. Test the nip solenoids by choosing Open Nips and Close Nips.
5. Fom the Align menu, enter Display Sensors and check the operation of the take-up jam sensor.

   The take-up jam wheel can be checked by inserting a piece of film down the right side of the take-up cassette platform until the sensor wheels move and cause a change in status for the take-up jam wheel.
6. Load media to check complete feed function.

4.3.3 Inner Take-up Drive (Nip) Assembly

Tools Required: 3/16" allen wrench

Remove:

1. Unload the media and turn the system off.
2. Open the top cover.
3. Remove the top and middle front panels. See Section 4.2.2, Top, Middle and Bottom Front Panels.
4. Remove the take-up light shield. See Section 4.3.1, Take-up Light Shield.
5. Remove the outer take-up drive (nip) assembly. See Section 4.3.2, Outer Take-up Drive (Nip) Assembly.

6. Disconnect the power plugs from the motor. Refer to Figure 4-9.

NOTE: For purposes of replacement, the power sockets are marked: 1 = red wire; 2 = brown wire. Refer to Figure 4-9.

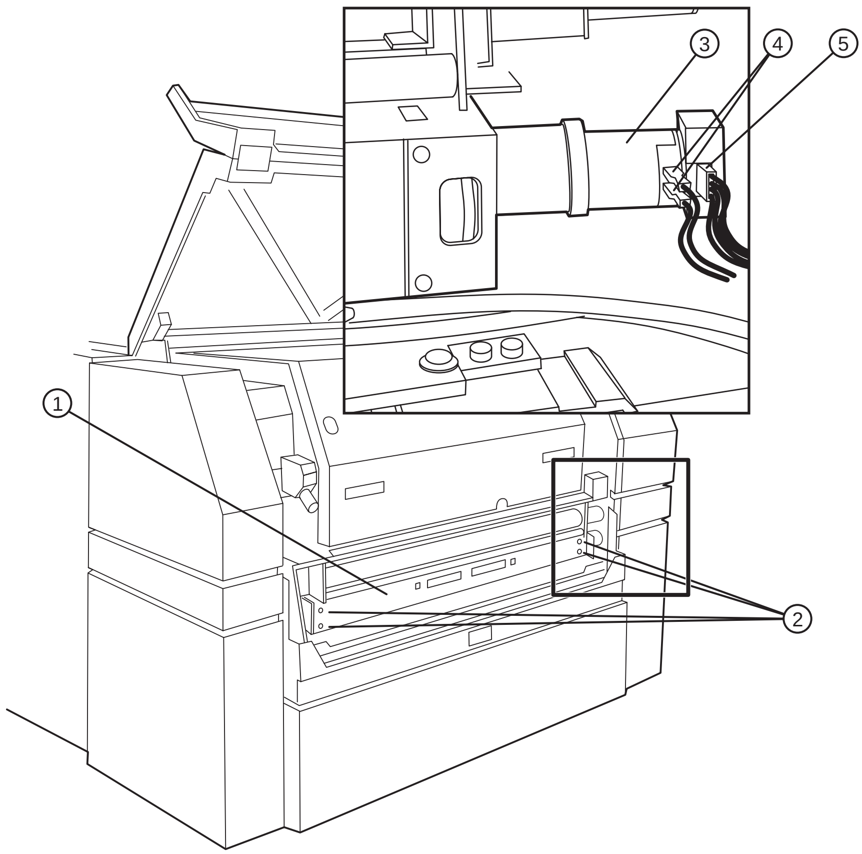


Figure 4-9 Inner take-up drive (nip) assembly.

①–Inner take-up drive (nip) assembly.
②–4 3/16" allen screws securing the drive to the system.
③–Motor. ④–2 power cables; 1=red, 2=brown.
⑤–Encoder cable.

7. Disconnect the encoder plug from the motor. Refer to Figure 4-9.

   Make note of the orientation for replacement.

8. Cut the two tie wraps on the mesh cable wrap (Velcro) to the right of the motor. Open the cable wrap.

9. Open the right side panel. See Section 4.2.1, Right/Left Side Covers.

10. Follow the sensor cable up to the take-up SDM board on the right side of the imagesetter. Unplug the sensor cable at its connector (J6) on the board. Refer to Figure 4-10.
11. Using a 3/16" allen wrench, remove the four (4) bolts, two (2) on each side of the inner take-up (nip) assembly. Refer to Figure 4-9.
12. Pull the assembly out, rocking it gently.

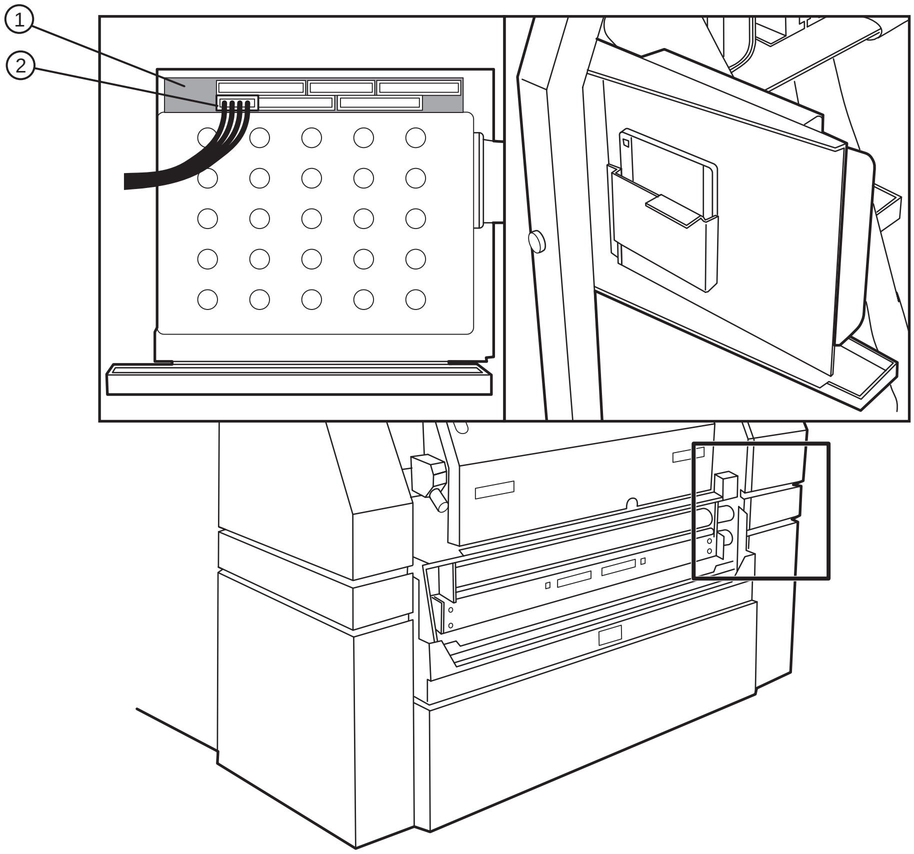


Figure 4-10 Take-up SDM board.

①–Take-up SDM board. ②–Sensor cable.

Replace:

1. Reverse the removal instructions to re-install the inner take-up drive nip assembly.
2. The take-up drive assembly should be checked for proper operation before the outer covers are installed.
3. After installing the outer take-up drive assembly and the light shield, turn the system on and launch the AVDIAG program from your PC.
4. Enter the Align menu and select Engine Primitives to test nip solenoids.

5. Enter Display Sensors from the Align menu and check the operation of the take-up jam sensor.

   The take-up jam sensor can be checked by inserting a piece of film down the right side of the take-up cassette platform until the sensor wheels move, which causes a change in status.

6. Load the media to check the complete feed function.

4.3.4 Inner Take-up Drive (Nip) Motor

Tools Required: 3/16" allen wrench, 1/4" and 5/16" nut driver

Remove:

1. Unload the media and turn the system off.
2. Open the top cover.
3. Remove the top and middle front panels. See Section 4.2.2, Top, Middle and Bottom Front Panels.
4. Remove the take-up light shield. See Section 4.3.1, Take-up Light Shield.
5. Remove the foam on either side of the outer take-up (nip) drive.
6. Remove the outer take-up (nip) drive. See Section 4.3.2, Outer Take-up Drive (Nip) Assembly.
7. Remove the inner take-up drive. See Section 4.3.3, Inner Take-up Drive (Nip) Assembly.

8. Cut the tie wraps on the motor. Refer to Figure 4-11.

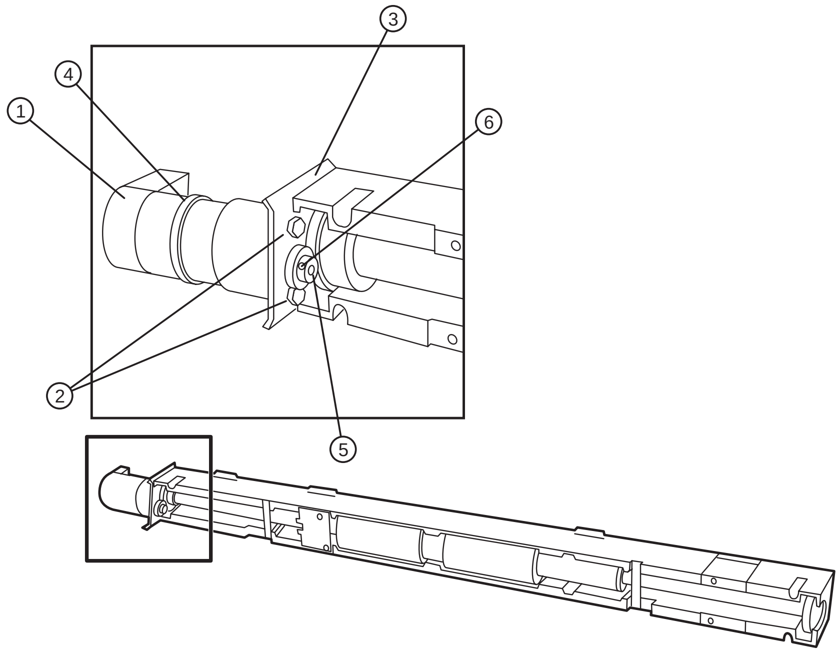


Figure 4-11 Inner take-up drive (nip) motor assembly

①–Inner take-up drive motor assembly. ②–Two 1/4" hex screws. ③–Bracket. ④–Tie-wrap. ⑤–Motor gear. ⑥–Allen screw.

9. Disconnect the power plugs from the motor. Refer to Figure 4-9.

NOTE: For purposes of replacement, the power sockets are marked: 1 = red wire; 2 = brown wire.

10. Disconnect the encoder plug from the motor. Refer to Figure 4-9.
11. Before removing the motor, test the backlash between the drive motor gear and the drive roller gear.

    This same backlash will be required after installing the new drive motor.
12. Using a 1/4" nut driver, remove the two (2) hex nuts attaching the motor to the bracket. Refer to Figure 4-11.
13. Remove the allen screw from the motor gear. Refer to Figure 4-11.
14. Remove the motor.

Replace:

1. Install the take-up drive motor using the two (2) 1/4" bracket screws removed in Step 11 in the removal procedure above. Refer to Figure 4-11.
2. Install the motor gear. Refer to Figure 4-11.
3. Check the backlash prior to tightening the bracket screws.
4. Turn the take-up drive roller to make sure that it turns smoothly and does not bind. If it does, the backlash needs to be re-adjusted.
5. Reverse the removal instructions starting with Step 9 to re-install the take-up drive motor.
6. The take-up drive assembly should be checked for proper operation before the front panels are replaced.
7. After installing the outer take-up drive assembly and light shield, turn the system on and launch the AVDIAG program from your PC.
8. Select ALIGN and select Engine Primitives to test the take-up nip solenoids.
9. From the Align menu, enter Display Sensors and check the operation of the take-up jam sensor.

   The take-up jam sensor can be checked by inserting a piece of film down the right side of the take-up cassette platform until the sensor wheels move and cause a change in status for the take-up jam sensor.
10. Load the media to check the complete feed function.

4.3.5 Take-up Jam Sensor

Tools Required: 1/4" nut driver, flathead screwdriver

Remove:

1. Remove the inner take-up drive. See Section 4.3.3, Inner Take-up Drive (Nip) Assembly.
2. Open the right side panel. See Section 4.2.1, Right/Left Side Covers.
3. Cut the tie wraps holding the wires to the motor. Refer to Figure 4-11.

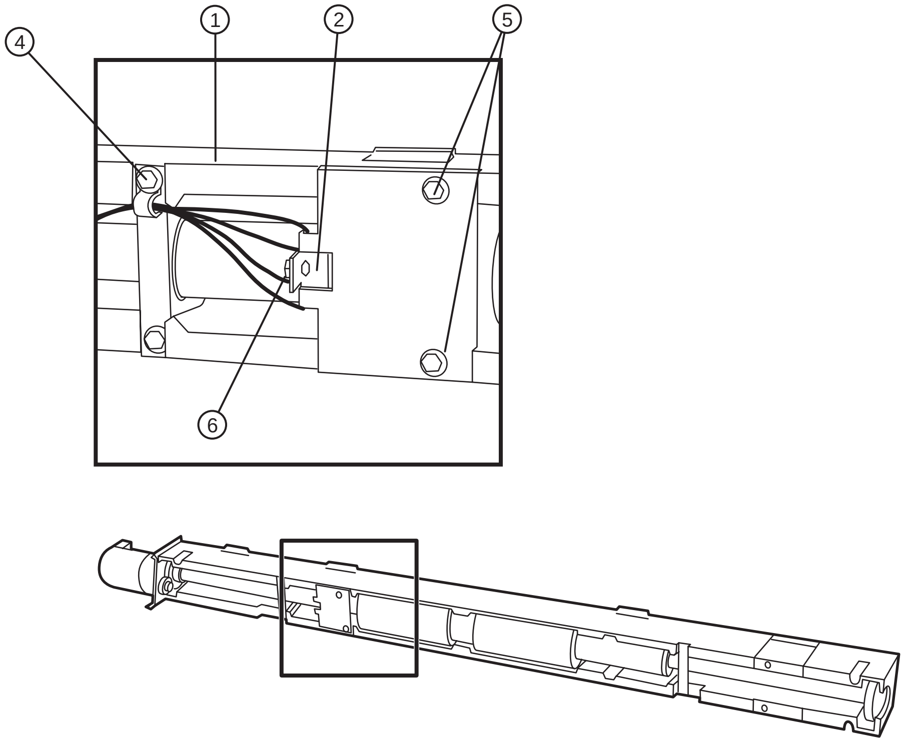


Figure 4-12 Inner take-up (nip) jam sensor.

①–Inner take-up drive (nip) assembly. ②–Take-up jam sensor.
③–1/4" hex head screw in tie clamp**.** ④–Two 1/4" hex head screws on bracket.
⑤–1/4" hex nut on sensor.

4. Using a 1/4" nut driver, remove the 1/4" hex head screw holding the tie clamp. Refer to Figure 4-12.

5. Using a 1/4" nut driver, remove the two (2) 1/4" hex head screws securing the sensor bracket to the take-up drive (nip) assembly. Carefully slide the bracket toward the motor to clear the jam sensor wheel. Refer to Figure 4-12.

6. Using a 1/4" nut driver, remove the nut securing the sensor to the bracket. Refer to Figure 4-12.

Replace:

1. Install the new jam sensor to the Jam Sensor bracket. Do not tighten the screw. Refer to Figure 4-12.
2. Install the jam sensor bracket into the inner take-up drive assembly. Refer to Figure 4-12.
3. Adjust the jam sensor so that it does not interfere with the jam sensor wheel.
4. Tighten the jam sensor screw. Refer to Figure 4-12.
5. Install the jam sensor plug into the main shell connector. Refer to Figure 4-10.
6. Install the connector back into the take-up SDM board at (J6). Refer to Figure 4-10.
7. Reverse the above removal instructions starting with Step 2.
8. After installing the inner take-up drive, the outer take-up drive, and the light shield turn the system on and launch the AVDIAG program from your PC.
9. Select ALIGN and then Display Sensors and check the operation of the take-up jam sensor.

   The take-up jam sensor can be checked by inserting a piece of film down the right side of the take-up cassette platform until the sensor wheels move and cause a change in status for the take-up jam sensor on your PC.

4.3.6 Take-up Punch Assembly

Tools Required: 3/16" allen, 3/8" and 1/2" nut driver, screwdriver

Remove:

1. Remove the outer take-up drive (nip) assembly. See Section 4.3.2, Outer Take-up Drive (Nip) Assembly.

   NOTE: The inner take-up drive (nip) assembly can remain in place.

2. Make scribe marks to the left, right and front corners of the take-up punch assembly. Refer to Figure 4-13.

   The marks aid in the replacement procedure.

3. Remove the take-up punch chafe pan. Refer to Figure 4-13.

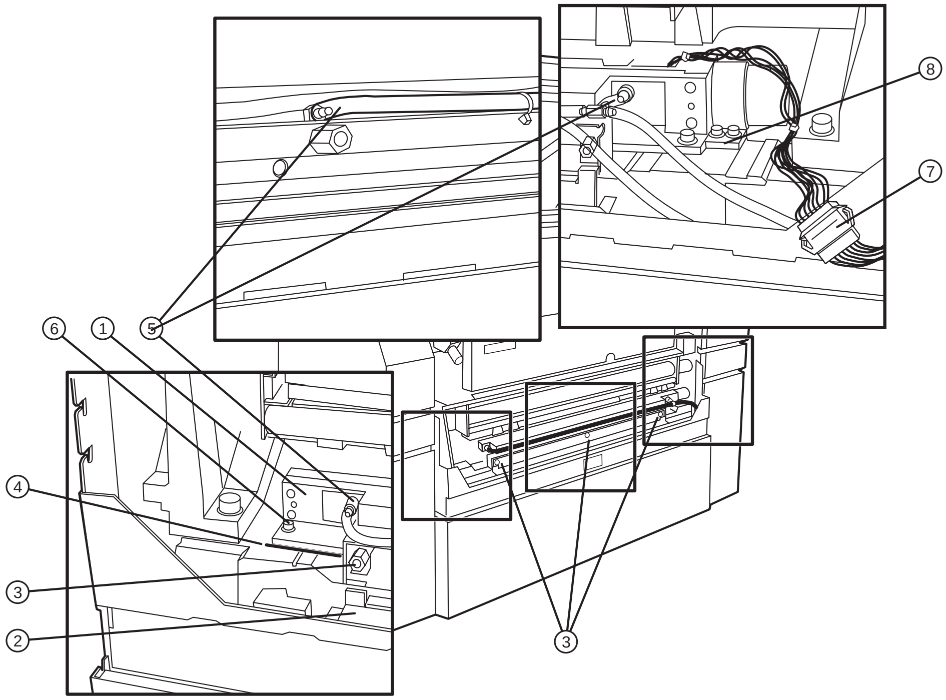


Figure 4-13 Take-up punch assembly.

①–Take-up punch assembly. ②–Take-up punch chafe pan.
③–Three chafe pan standoffs. ④–Scribe marks (left and right).
⑤–Three vacuum tubes. ⑥–Two 3/16" hex bolts. ⑦–Sensor motor connector.
⑧–Punch shoe (DO NOT REMOVE).

4. Remove the three (3) standoffs securing the chafe direction shield attached to the front of the punch assembly. Remove the chafe direction shield from the system. Refer to Figure 4-13.
5. Cut the tie wraps on the three (3) vacuum lines and remove the lines from the assembly. Refer to Figure 4-13.
6. Disconnect the sensor motor connector. Refer to Figure 4-13.

CAUTION: Do not loosen or remove the two (2) 3/16" allen screws that secure the punch shoe (located to the right of the punch assembly) to the drum base. Refer to Figure 4-13. This punch shoe, set at the factory, is used for left to right alignment of the punch assembly. To avoid damage to the carriage and drum, do not let the punch tilt into the machine.

---

7. Remove the two (2) 3/16" hex bolts securing the take-up punch assembly to the outer drum surface. Refer to Figure 4-13.
8. Remove the punch assembly from the system.

Replace:

1. Install the punch assembly to the scribe marks. Refer to Figure 4-13.
2. Move the take-up punch assembly completely to the right until it touches the punch shoe. Tighten the two (2) 3/16" allen screws.
3. Reverse the above removal procedures starting with Step 10.
4. After installing the outer take-up drive assembly, turn the system on and launch the AVDIAG program from your PC.
5. Select Test and then Selectable Test.
6. Select Media Tests and then Take-Up Punch.

   The take-up punch should move and pass the test.
7. Insert a piece of film from the drum surface to the punch assembly. Push it in to the punch and check that it moves freely without getting jammed.

NOTE: The punch opening should not be extended beyond the drum surface.

4.3.7 Cutter Assembly

Tools Required: 5/16" nut driver with extension, allen wrench .050, screwdriver

Remove:

1. Remove the outer take-up drive (nip) assembly. See Section 4.3.2, Outer Take-up Drive (Nip) Assembly.

NOTE: The inner take-up drive (nip) assembly can remain in place.

2. Open the right side cover. See Section 4.2.1, Right/Left Side Covers.
3. Disconnect the power cable located near the SDM board on the right side of the imagesetter.
4. Remove the switch/sensor connector (J4) from the take-up SDM board. Refer to Figure 4-14.

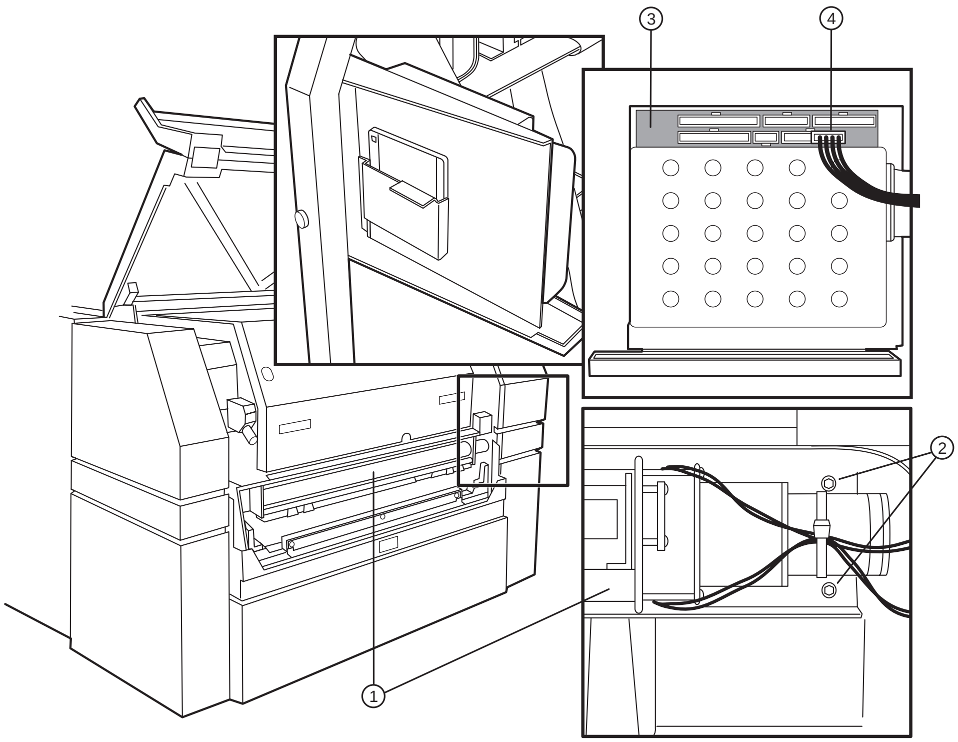


Figure 4-14 Cutter assembly and SDM board.

①–Cutter assembly. ②–Two of four 3/16 " hex bolts.
③–SDM board. ④–Switch/sensor connector (J4).

5. Remove the rubber foam from the sides of the cutter assembly.

WARNING: Use two people to remove the cutter assembly.

CAUTION: The media entrance and exit guides on the cutter assembly can be easily bent if they come into contact with a hard surface. When working or placing the cutter assembly down, always face the mounting plate (the plate that was attached to the system) in the down position.

---

6. Remove the four (4) 3/16" hex screws, two (2) on the left and two (2) on the right, securing the cutter assembly to the drum. Refer to Figure 4-14.

Replace:

1. Reverse the removal instructions to re-install the cutter assembly.

4.3.8 Cutter Motor

Tools Required: Phillips screwdriver, 5/64" allen wrench

Remove:

1. Remove the cutter assembly. See Section 4.3.7, Cutter Assembly.
2. Cut the tie wrap around the motor holding the wires in place.

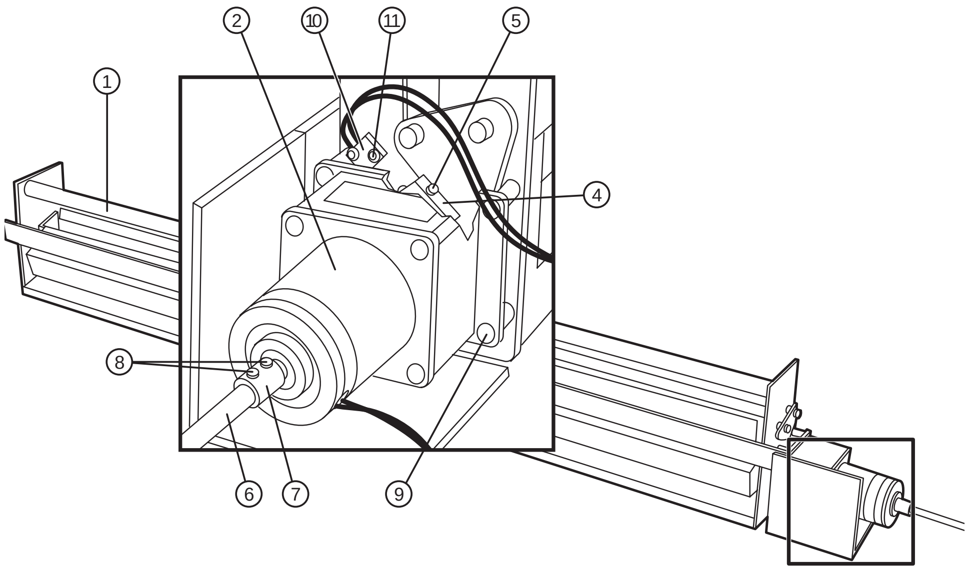


Figure 4-15 Cutter motor.

①–Cutter assembly. ②–Cutter motor.
④–Motor cam. ⑤–Two 5/64" allen screws. ⑥–Shaft. ⑦–Coupler.
⑧–Two 5/64" allen screws. ⑨–Four phillips screws. ⑩–Cutter Home Sensor.
11–Two phillips screws.

3. Twist the shaft at the end of the motor so that the 5/64" allen screws on the coupler are visible. Refer to Figure 4-15.
4. Loosen the two (2) allen screws on the coupler and remove the motor shaft. Refer to Figure 4-15.
5. Remove the four (4) phillips screws securing the cutter motor to the stand-offs. Refer to Figure 4-15.
6. Loosen the two allen screws on the motor cam. Remove the motor from the cutter assembly.

Replace:

1. Reverse the above procedure to re-install the cutter motor.
2. The cutter assembly should be checked for proper operation before the outer covers are installed.
3. Turn the system on and launch the AVDIAG program from your PC.

4. Select Test and then Selectable Test.
5. Select Media Test and then Cutter.

   The cutter should make one revolution and pass the test.

4.3.9 Take-up Media Present Detector

Tools Required: 3/4" nut driver, small screwdriver, 3/16" wrench

Remove:

1. Remove the cutter assembly. See Section 4.3.7, Cutter Assembly.
2. Position the cutter assembly so that the cutter motor is to the right and the mounting plate (the plate that attaches the cutter assembly to the drum) is facing down. Refer to Figure 4-16.

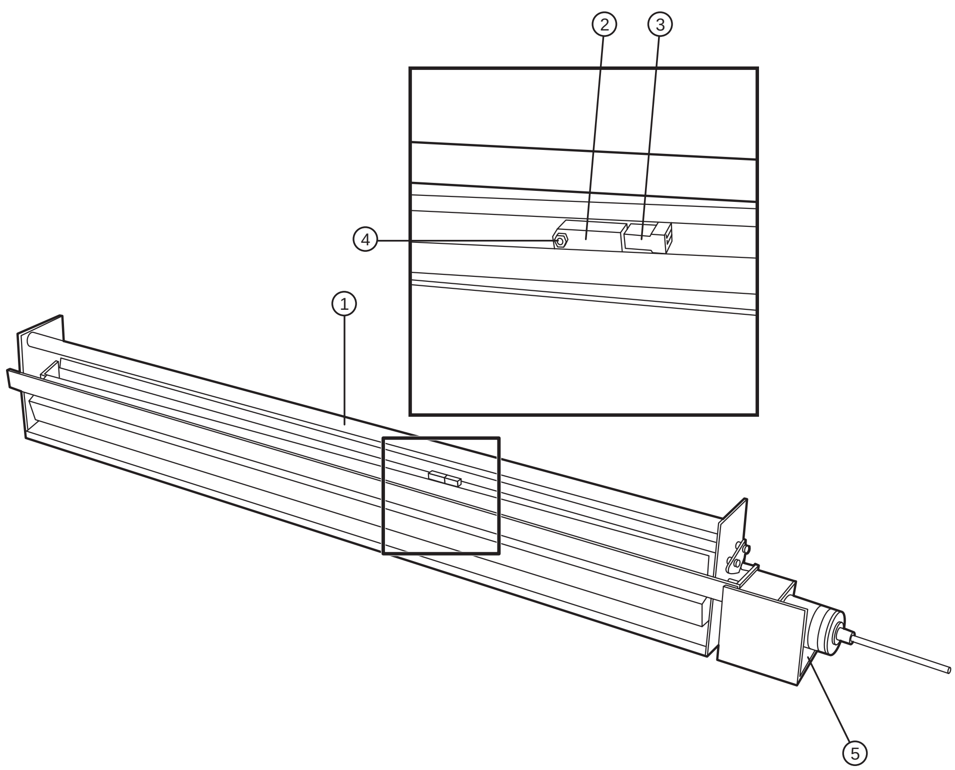


Figure 4-16 Take-up media present sensor.

①–Cutter assembly. ②–Take-up media present sensor.
③–Sensor connector. ④–1/4" hex nut. ⑤–Mounting plates.

3. Remove the connector from the media present sensor. Refer to Figure 4-16.
4. Using a 1/4" open end wrench, remove the hex nut securing the media present sensor. Refer to Figure 4-16.

Replace:

1. Reverse the above removal procedure.
2. Before installing the light shields and panels, turn the system on and launch the AVDIAG program from your PC.
3. Select Align, then Display Sensors.
4. Check the take-up media present sensor by inserting a piece of film down the left side of the take-up cassette platform until the sensor is covered.

   This should cause a change in status for the take-up media present sensor on the PC.

4.3.10 Supply Jam and Media Present Sensors

Tools Required: 1/4" nut driver, tie wrap, 1/4" wrench

Remove:

NOTE: Before starting, make sure that the A spindle is nipped.

1. Unload any media and remove both supply cassettes.
2. If the bridge is present, put it in light mode. Lift the bridge to the up position.
3. Push down the cassette A tray to lock. Slide the cassette B tray to the out position.
4. Remove the two (2) screws, which are located under the bottom spindle roller, securing the cover to the supply jam and media present sensor assembly.
5. Open the left side door and remove the three (3) screws securing the left supply media guide light shield.
6. Remove the two screws securing the bottom roller bearing retainer. Remove the bottom roller.
7. Remove the two screws securing the supply and media present sensor assembly. Remove the connectors from the assembly.

Replace:

1. Reverse the above procedure.

NOTE: To install the bottom roller, compress the spring using a tie wrap. Put the roller in and then cut the tie wrap to remove it.

4.4 Electrical Removal/Replacement Procedures

The following describes the electrical removal/replacement procedures.

4.4.1 Digital Engine Controller (DEC) PCB

Tools Required: 1/4" nut driver, small screwdriver.

NOTE: Prior to removing the DEC PCB, ensure that the DEC machine parameters, the DSP FLASHROM software and the DEC correction tables are saved. Also, ensure that a copy of the DEC K1 FLASHROM and DSP FLASHROM software are loaded in the PC.

Remove:

1. Turn the system off and unplug the power cord from the outlet.
2. Open the right side cover. See Section 4.2.1, Right/Left Side Covers.
3. Remove the electronics enclosure cover. See Section 4.2.3, Electronic Enclosure Cover.
4. Disconnect the APIS, serial/modem, modem power cables, and the bridge and vacuum connectors from the DEC's external connectors. Refer to Figure 4-17.
5. Disconnect the internal cables, SDMs/CSDM/OCP, power supply. Refer to Figure 4-17.

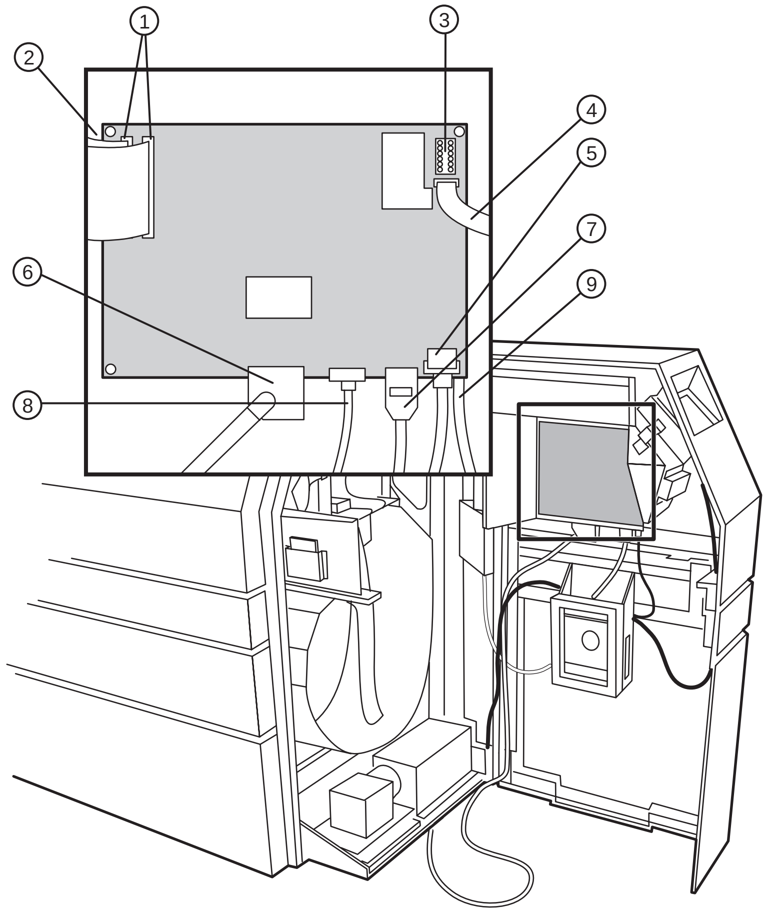


Figure 4-17 Digital Engine Controller PCB (DEC) (cable locations).

①–SDMs (2). ②–CSDM cable (behind SDM cable). ③–Power supply. ④–OCP. ⑤–Vacuum. ⑥–Apis. ⑦–Bridge. ⑧–Modem. ⑨–Modem power

6. Remove the six (6) hex screws from the bottom of the electronics enclosure securing the DEC plate to the enclosure. Refer to Figure 4-18.
7. Remove the three (3) hex screws securing the DEC PCB in the enclosure and remove the board. Refer to Figure 4-18.

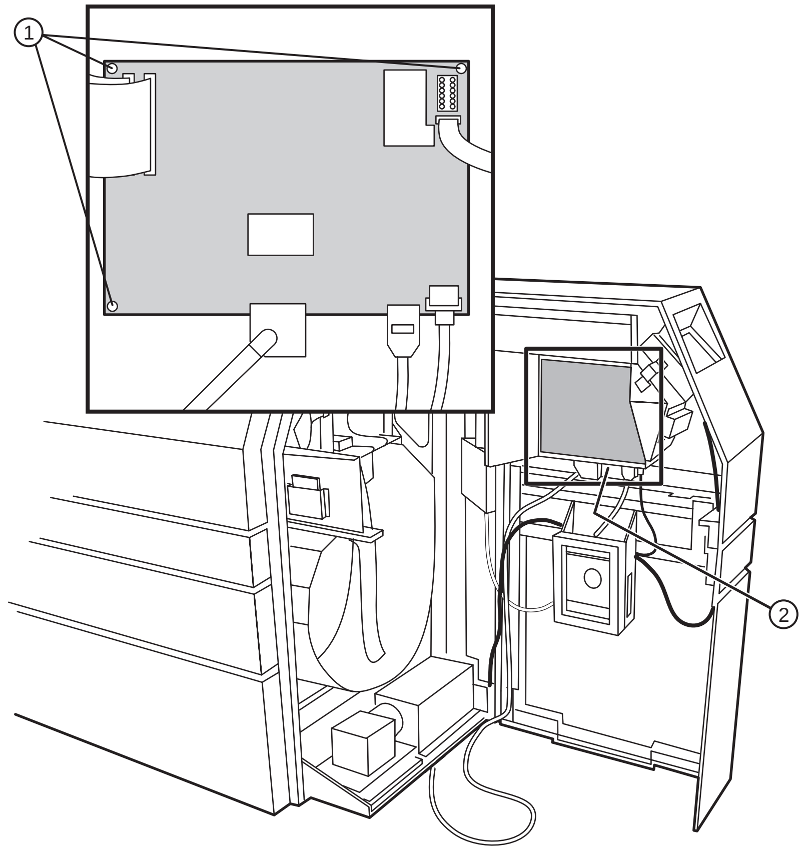


Figure 4-18 Digital Engine Controller PCB (DEC) screw locations.

①–Three screws (located in three corners of the DEC board).
②–Six screws located underneath electrical enclosure.

Replace:

1. Install the new DEC board by reversing the above steps.
2. Download and restore all DEC machine parameters.
3. Download the DEC DSP and correction tables.
4. If necessary, program the DEC K1 FLASHROM.
5. Run the following imager files:
   - Continuous mode: 1x1 Horizontal Line
   - Stop/Start mode: 50% / 85% / 96% tint

4.4.2 Carriage Sensor Driver (CSDM) PCB

Tools Required: 3/16" nut driver, small screwdriver

Remove:

1. Turn the system off and unplug the power cord from the outlet.
2. Open the left and right side covers. See Section 4.2.1, Right/Left Side Covers.
3. Remove the inner light shields on the right side of the system, then the light shield on the left side of the system. See Section 4.6.1, Light Shields (Right and Left).

   This accesses both sides of the carriage assembly.
4. On the right side of the system, disconnect the flex cable, LDM cable, SGM sensors cable, SGM motors cable, digital encoder connector from the CSDM PCB. Refer to Figure 4-19.

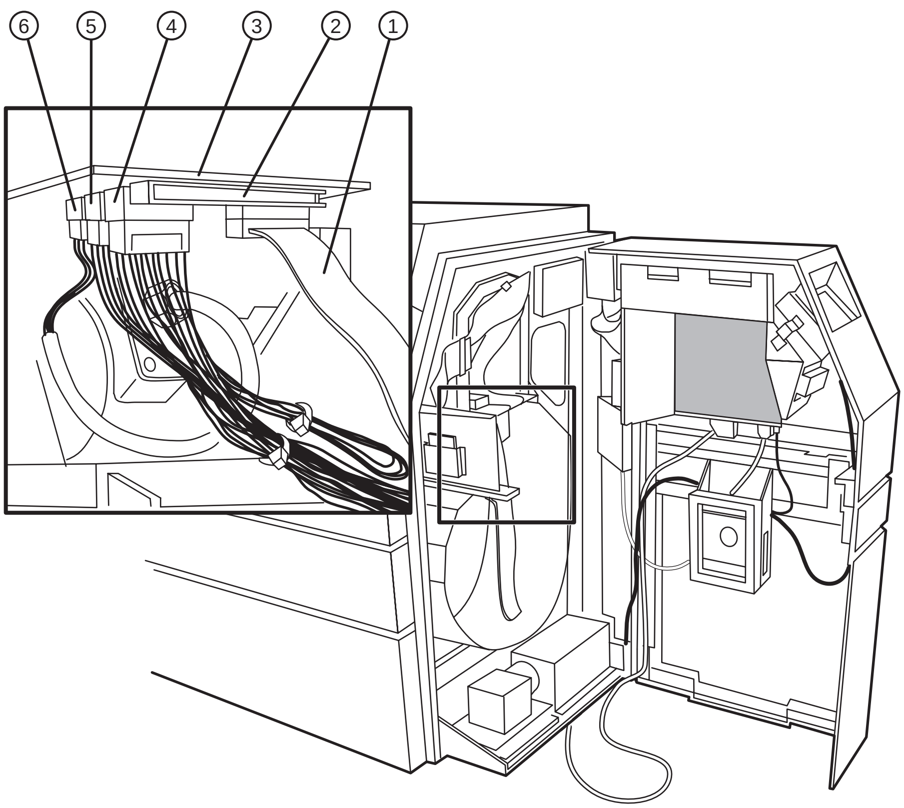


Figure 4-19 Carriage sensor driver module PCB (CSDM) (right side).

①–LDM cable. ②–Flex cable connector. ③– CSDM PCB.
④–SGM Sensor Connector. ⑤–SGM motor connector.
⑥–Digital encoder connector.

5. On the left side of the system, disconnect the spin motor cable, spin motor encoder cable, carriage motor cable and analog encoder cable from the CSDM PCB. Refer to Figure 4-20.

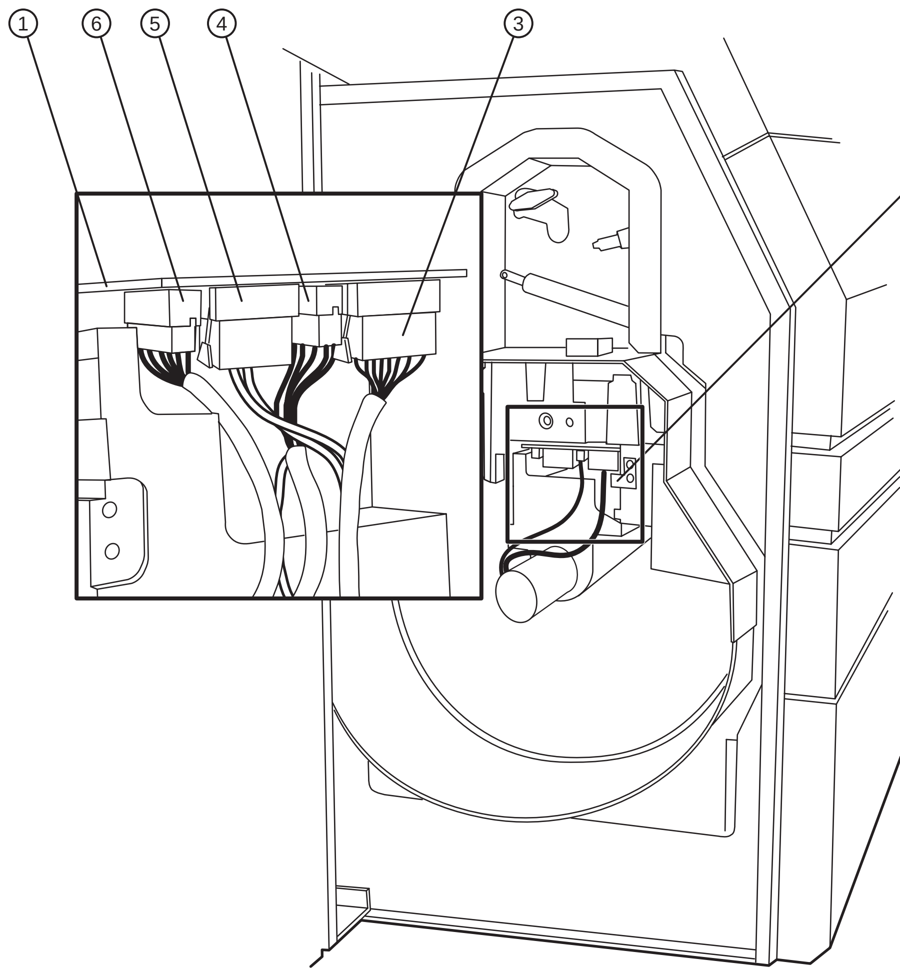


Figure 4-20 Carriage sensor driver module PCB (CSDM) (left side).

①–CSDM PCB. ②–3/16" hex screws and retaining clip.
③–Spin motor cable connector. ④–Spin motor encoder cable connector.
⑤–Carriage motor cable connector. ⑥–Analog encoder cable connector.

6. Remove the two (2) 3/16" hex screws and retaining clip securing the CSDM to the carriage assembly. Refer to Figure 4-20.

7. Slide the PCB out of the carriage assembly.

Replace:

1. Slide the new CSDM into the carriage assembly and secure with the retaining clip.
2. Install the cabling at both ends of the PCB as removed in previous steps.
3. Turn the system on and launch the AVDIAG program from your PC. Select Test and then Selectable Test. Select Carriage Test and then Carriage.

   The carriage should move and pass the test.
4. Run the following imager files:
   - Continuous mode: 1x1 Horizontal Line
   - Stop/Start mode: 50% / 85% / 96% tint

4.4.3 Operator Control Panel Assembly

Tools Required: 1/4" nut driver, 5/16" nut driver

NOTE: Prior to removing the OCP assembly, ensure that the customer user parameter settings have been saved and a copy of the OCP FLASHROM software is available for downloading.

Remove:

1. Turn the system off and unplug the power cord from the outlet.
2. Open the right side doors. See Section 4.2.1, Right/Left Side Covers. Remove the electronics enclosure cover. See Section 4.2.3, Electronic Enclosure Cover.
3. Disconnect the OCP ribbon cable from the DEC board. Refer to Figure 4-21.

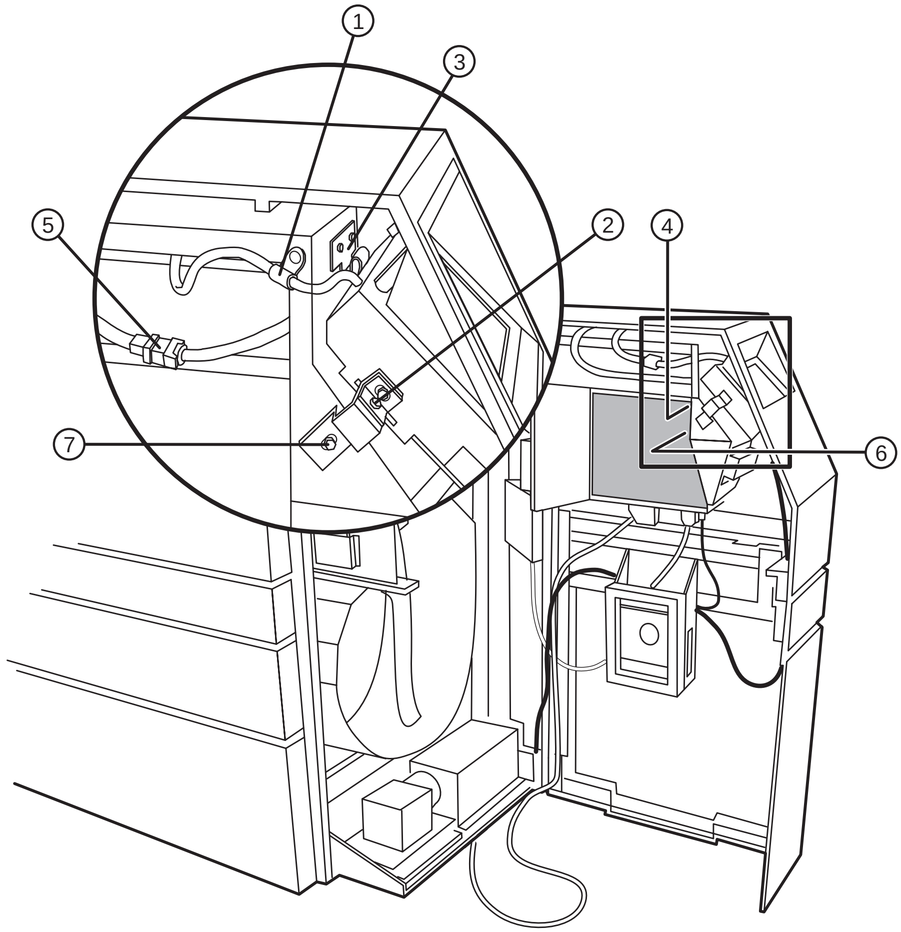


Figure 4-21 Operator control panel (OCP).

①–Power cord clamp. ②–Removable mounting bracket's 1/4" hex screw.
③–1/4" hex screws (2) securing OCP ribbon cable bracket.
④–Power supply connector. ⑤–AC power connector.
⑥–OCP ribbon cable. ⑦–Removable mounting bracket's 5/16" hex screw.

4. Remove the hex screw securing the power cord clamp to the electronics enclosure. Refer to Figure 4-21.
5. Remove the power connector located below the control panel.
6. Remove the power connector going to the power supply. Refer to Figure 4-21.
7. Loosen the 1/4" hex screw securing the OCP assembly to the removable mounting bracket. Refer to Figure 4-21.
8. Remove the 5/16" hex screw securing the removable mounting bracket to the electronics enclosure. Refer to Figure 4-21.

9. Slide the mounting bracket out from the back of the OCP assembly. Pull the assembly out through the front of the system and rest it on the top cover.
10. Remove the two (2) 1/4" hex screws securing the control panel ribbon cable to the electronics enclosure. Refer to Figure 4-21.
11. Feed the ribbon cable through this hole to complete the removal of the control panel.

Replace:

1. Install the new OCP assembly by reversing the steps in the removal procedure.
2. Ensure that the OCP assembly centers and seats properly before securing the 1/4" and 5/16" hex screws.
3. Turn the system on and allow the boot sequence to complete.

NOTE: Observe the OCP firmware revision as the system boots up. Ensure that no boot errors have occurred and that the display looks correct.

4. If the control panel is not up to the latest revision and you have that revision stored in your PC, then you must reprogram the control panel FLASHROM. Refer to Chapter 3, Section 3.3.4.4. Program OCP FLASHROM.
5. Restore the previously saved OCP user parameters to the OCP.

NOTE: When the system is turned off, it automatically saves all customer parameter settings that have changed since the last power up.

4.4.4 The Supply and Take-Up Sensor Driver Modules PCB (SDMs)

Tools Required: Screwdriver

Remove:

1. Turn the system off and unplug the power cord from the AC outlet.
2. Open the right side cover. See Section 4.2.1, Right/Left Side Covers.
3. Remove the three (3) 3/16" hex screws securing the plastic shield to the SDMs. Remove the shield. See Section 4.6.1, Light Shields (Right and Left).
4. Disconnect all cable connectors from the take-up SDM and/or the supply SDM.
5. Remove the two (2) 1/4" hex screws securing the board(s).

6. Gently squeeze the side of the remaining two (2) plastic stand-offs while pulling the board(s) free from each stand-off.

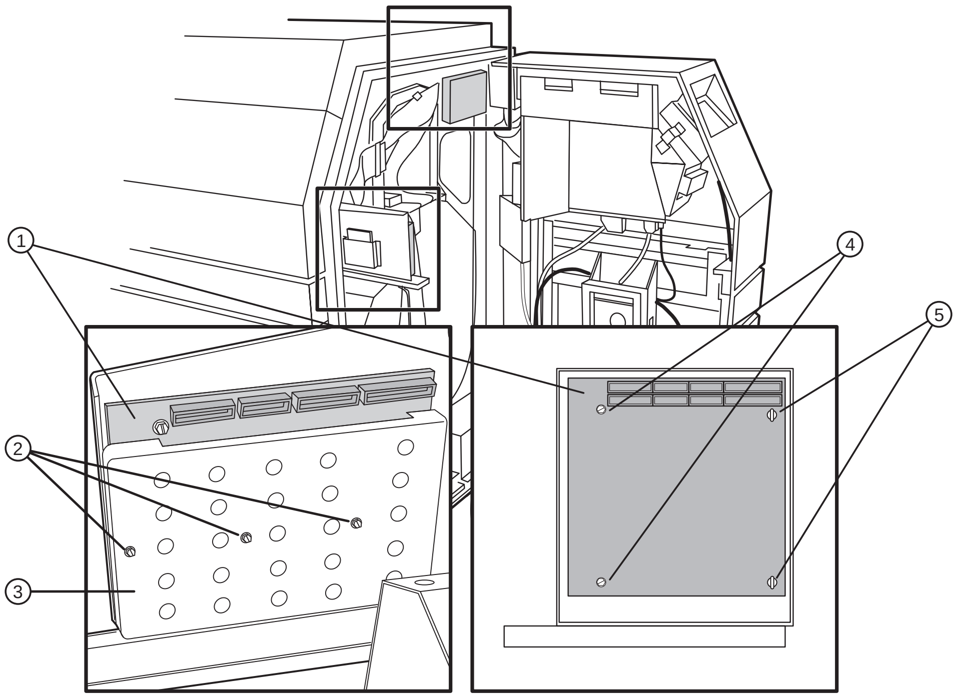


Figure 4-22 The take-up and supply sensor driver modules (SDMs).

①–SDM modules. ②–Three 3/16" hex screws. ③–Plastic shield.
④–Two 1/4" hex screws. ⑤–Two plastic standoffs.

Replace:

1. Push the SDM(s) back onto the two (2) stand-offs and secure with the two (2) 1/4" hex screws.
2. Connect all cables removed in previous steps.
3. Launch the AVDIAG program from your PC and ensure that all functions work properly for the SDM (supply or take-up) being replaced.

   The following lists the functions that should be tested for each type.

Supply	Take-Up
Swap Spindle	Open/Close Nips
Supply Motor	T-U Motor
Supply Punch	T-U Punch

4.4.5 Power Supply

Tools Required: 1/4" nut driver.

Remove:

1. Turn the system off and unplug the power cord from the AC outlet.
2. Open the right side cover. See Section 4.2.1, Right/Left Side Covers.
3. Remove the electronics enclosure cover. See Section 4.2.3, Electronic Enclosure Cover.
4. Remove the screw securing the ground wire located behind the intake fan assembly. Refer to Figure 4-23.
5. Remove the two (2) wires going to the intake fan.

   Note the orientation of the wires for re-installation.

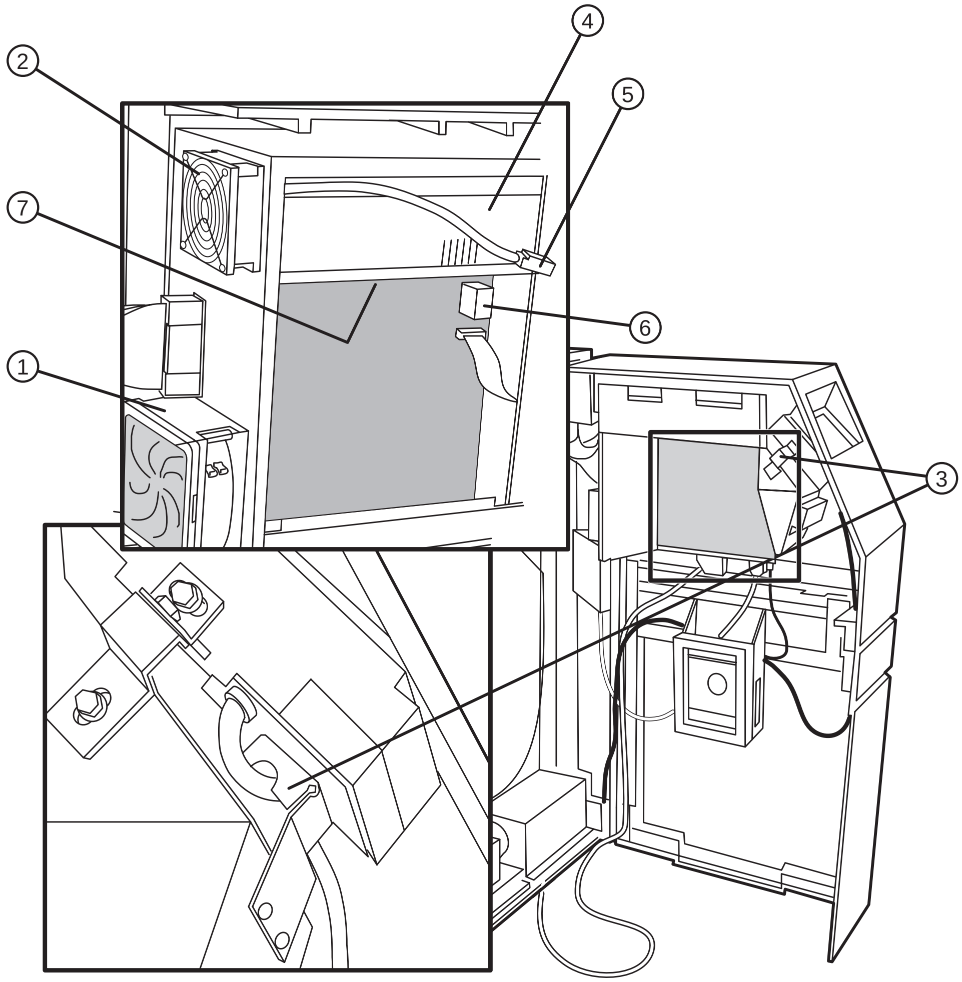


Figure 4-23 Power supply.

①–Intake fan. ②–Exhaust fan. ③–Power connector to control panel.
④–Power supply. ⑤–AC power connector. ⑥–Power connector to DEC Board.
⑦–Three hex screws under shelf.

6. Remove the cable clamp on the intake fan securing the cable wires. Refer to Figure 4-23.
7. Disconnect the connector going to the exhaust fan. Refer to Figure 4-23.
8. Remove the cable clamp on the rear panel and disconnect the two connectors going to the bottom drum fan assembly and to the door interlock switches.
9. Cut the tie clamps releasing the exhaust fan cable from the cable harness.
10. Remove the power connector to the DEC board. Refer to Figure 4-23.

11. Disconnect the power connector from the control panel to the power supply. Refer to Figure 4-23.
12. Remove the three (3) hex screws that secure the power supply to the electronic enclosure shelf. Refer to Figure 4-23.
13. Slide the power supply out of the electronics enclosure while passing the power connector and fan wires through the holes provided in the electronics enclosure.

Replace:

1. Reverse the removal procedure to re-install the power supply.
2. Turn the system on and check for proper operation.

4.4.6 Main Power Switch

Tools Required: Pliers, 1/4" nut driver

Remove:

1. Remove the operator control panel. See Section 4.4.3, Operator Control Panel Assembly.

NOTE: You do not have to save the customer user parameters if only the power switch is being replaced.

2. Loosen the 1/4" hex screw securing the plate over the power-on switch. Refer to Figure 4-24.

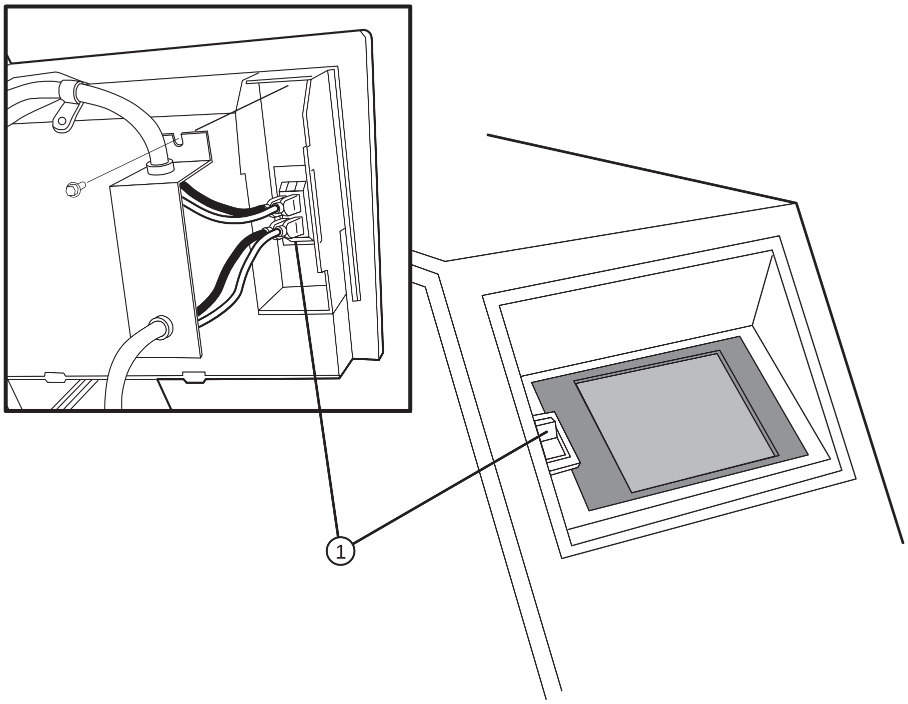


Figure 4-24 Main power switch and plug locations.

①–Main power switch and plugs.

3. Slide the plate down and out of the OCP.
4. Remove the brown and blue wires going to the power switch. Refer to Figure 4-24.

   Note the wiring orientation for re-installation.
5. Using your fingers, squeeze both the top and bottom back of the switch while pushing the switch forward through the control panel bezel.

Replace:

1. Reverse the removal procedure to re-install the main power switch.
2. Turn the power on and check the power light-on switch.

4.4.7 Exhaust Fan

Tools Required: 1/4" nut driver.

Remove:

1. Open the right side covers. See Section 4.2.1, Right/Left Side Covers.
2. Remove the screw securing the wire clamp on the top left corner of the intake fan assembly (below the exhaust fan). Refer to Figure 4-26.
3. Disconnect the wire connector from the exhaust fan. Refer to Figure 4-25.

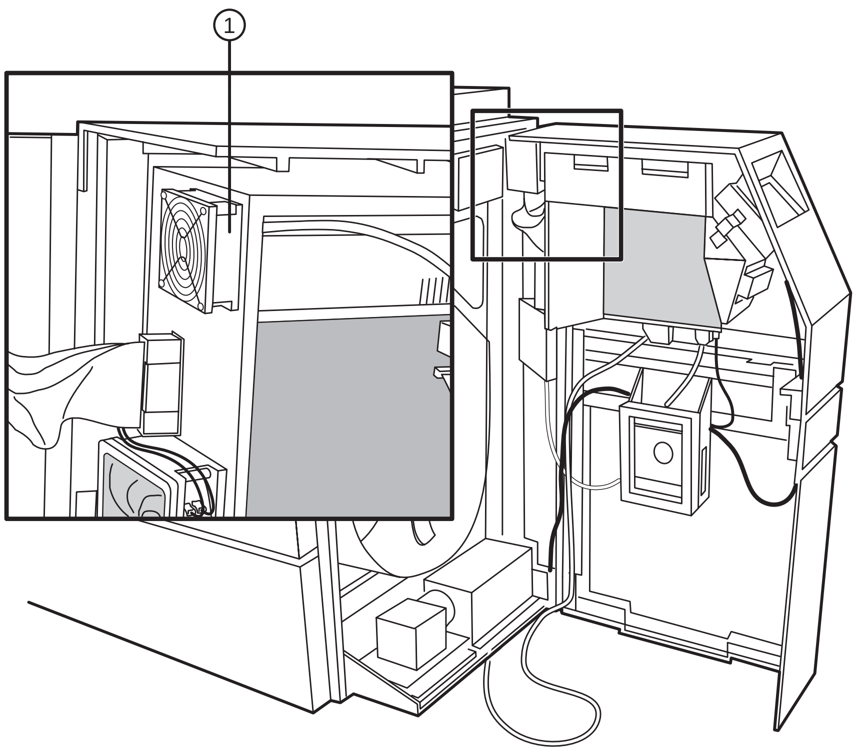


Figure 4-25 Exhaust fan location.

①–Exhaust fan.

4. Cut the tie wraps.
5. Remove the four (4) screws securing the exhaust fan from the electronic enclosure and remove the assembly.

Replace:

1. Reverse the removal procedures to re-install the exhaust fan.
2. Turn the system power on and check the exhaust fan for proper operation.

4.4.8 Intake Fan

Tools Required: 3/4" nut driver, screwdriver

Remove:

1. Open the right side cover. See Section 4.2.1, Right/Left Side Covers.
2. Remove the two wires going to the intake fan.

   Note the wire color orientation for re-installation.
3. Snap out the plastic removable guide and remove the fan filter.
4. Remove the four (4) hex screws securing the fan to the mount.

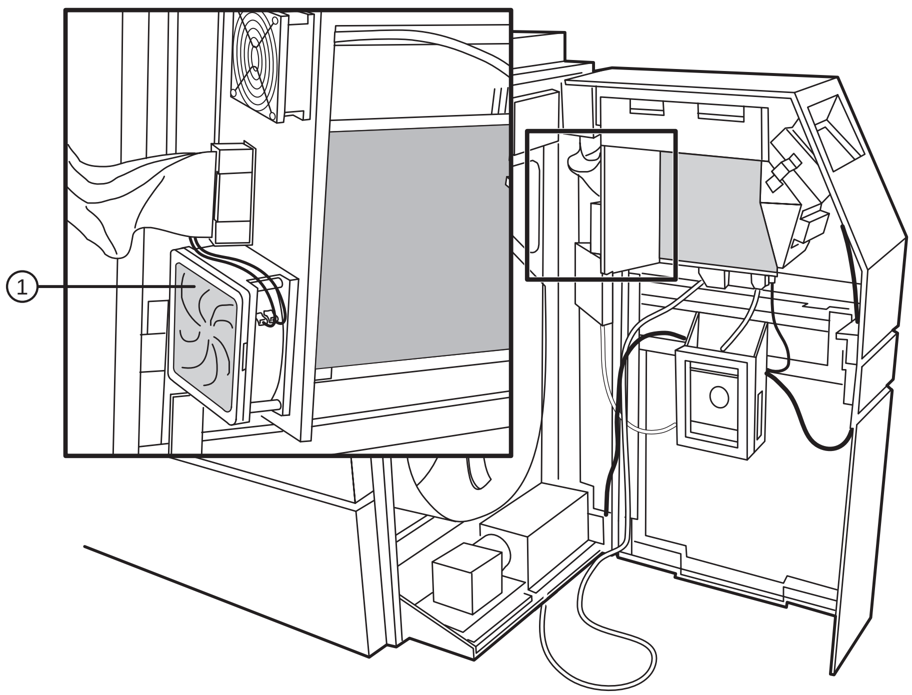


Figure 4-26 Intake fan location.

①–Intake fan.

Replace:

1. Reverse the removal procedure to re-install the intake fan assembly.
2. Turn the system power on and check intake fan for proper operation.

4.5 Carriage Drive Removal/Replacement Procedures

The following describes the carriage drive removal/replacement procedures.

4.5.1 Carriage Transfer Tool Installation

Tools Required: phillips screwdriver

NOTE: It is recommended that you remove the left side cover before you install the carriage transfer tool.

Remove:

1. Open the right and left side covers. See Section 4.2.1, Right/Left Side Covers.
2. Remove the right and left inner light shields. See Section 4.6.1, Light Shields (Right and Left).
3. Remove the two (2) screws securing the left end carriage stop to the engine frame.
4. Assemble the Carriage Transfer Tool. Refer to Figure 4-27.

   Both sides are pinned for proper orientation.

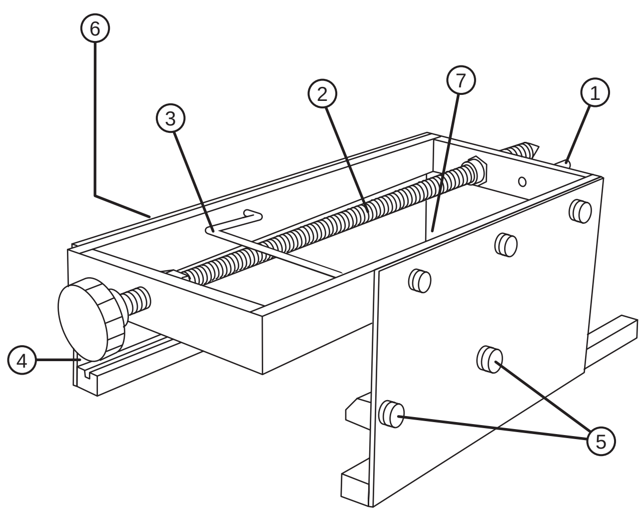


Figure 4-27 Carriage transfer tool.

①–Alignment pin. ②–Screw. ③–Handle. ④–Carriage stop pin.
⑤–Retaining bracket screws (2 on each side). ⑥–Locking pin (2) not shown.
⑦–Left rail alignment pin .

5. Make sure that both the bearing and magnet retaining brackets are in the up position and that the screws are tightened on the transfer tool. Refer to Figure 4-27.
6. Make sure that the carriage locking pins are in the retract position (out) on the transfer tool. Refer to Figure 4-27.
7. Insert the carriage transfer alignment pin into the hole on the engine upper structure frame. Refer to Figure 4-28.

   Line up the pin on the transfer tool left rail with the hole in the carriage left rail.
8. Tighten the transfer tool screw, making sure that the alignment lip on the bottom of the transfer tool right rail is up against the bottom of the carriage right rail.
9. After the transfer tool is secured make sure that the top surface of the transfer tool rails line up with the top surface of the carriage rails.

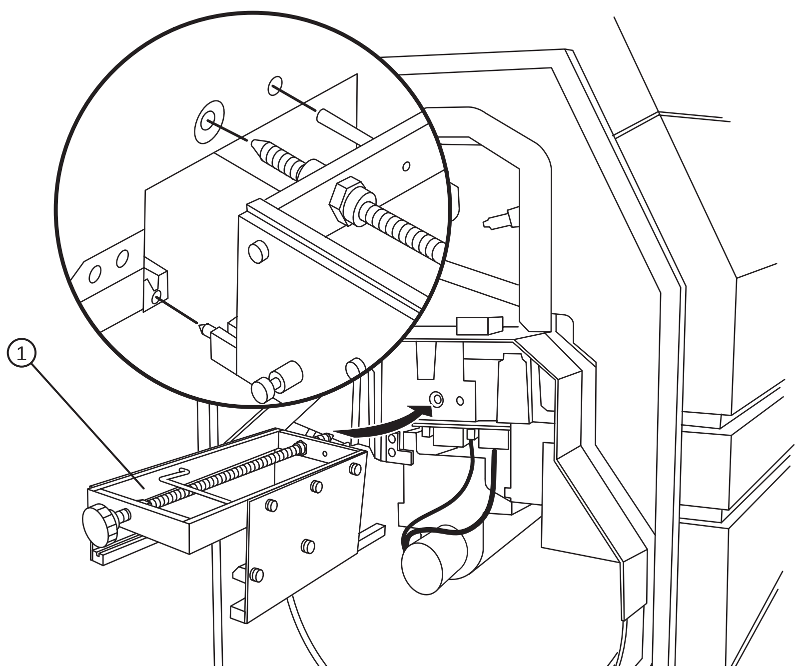


Figure 4-28 Inserting the carriage transfer tool.

①–Carriage transfer tool.

4.5.2 Carriage Assembly

Tools Required: Carriage transfer tool

Carriage Removal to Transfer Tool:

1. Refer to the carriage transfer tool installation in Section 4.5.1, Carriage Transfer Tool Installation.
2. On the right side of the drum, remove the flex cable going to the carriage board.
3. Move the carriage gently to the left side of the drum.
4. Remove the two (2) power cable connectors going to the brushes on the inner shrouds.
5. Loosen the four (4) screws securing the left inner shroud to the carriage. Remove the shroud.
6. Loosen the four (4) screws securing the right inner shroud to the carriage. Remove the shroud.
7. Gently push the carriage assembly onto the carriage transfer tool. Refer to Figure 4-29.

   Some resistance will be felt when the magnets break free from the carriage rails.

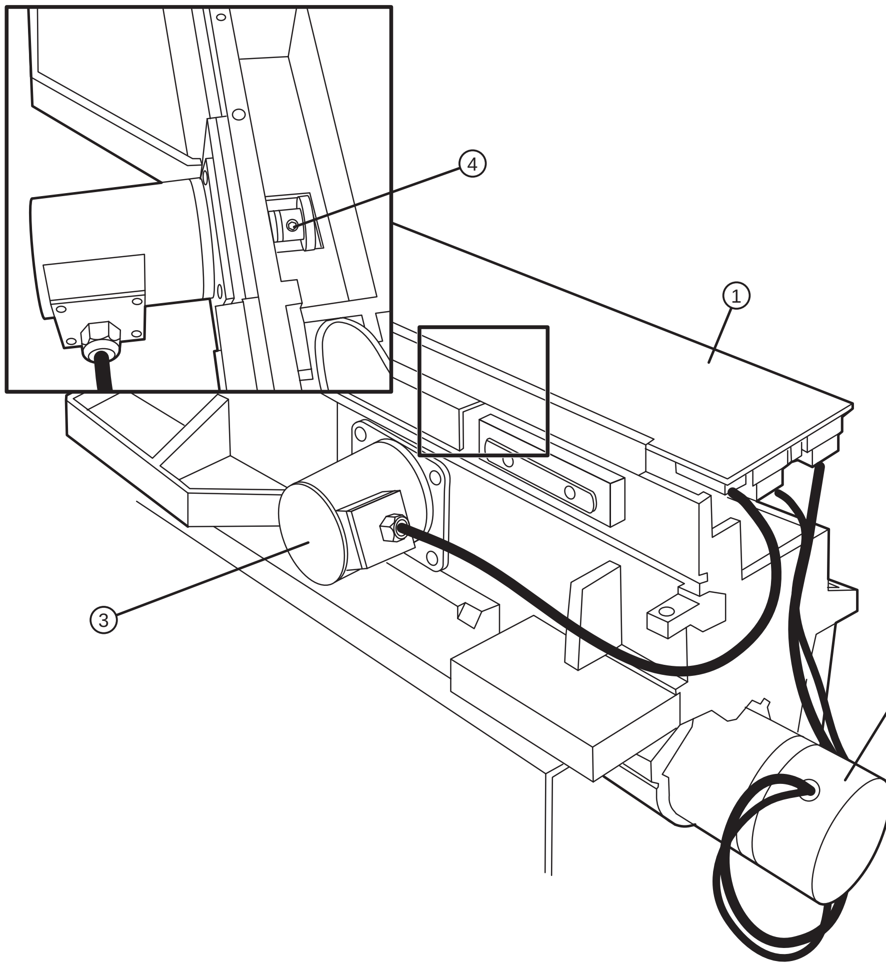


Figure 4-29 Carriage assembly.

①–Carriage board. ②–Spin motor assembly. ③–Analog encoder. ④–Analog encoder coupler.

8. Push the carriage to the transfer tool carriage stop.
9. Engage the locking pins on the side of the transfer tool. Refer to Figure 4-27.
10. Loosen the two (2) retaining bracket screws that hold the bearing retainer bracket in the up position on the transfer tool. Refer to Figure 4-27.

    The bearing retainer bracket moves down to secure the carriage bearings.
11. Tighten both retainer screws. Refer to Figure 4-27.
12. Loosen the two (2) retainer screws that hold the magnet bracket in the up position on the transfer tool. Refer to Figure 4-30.

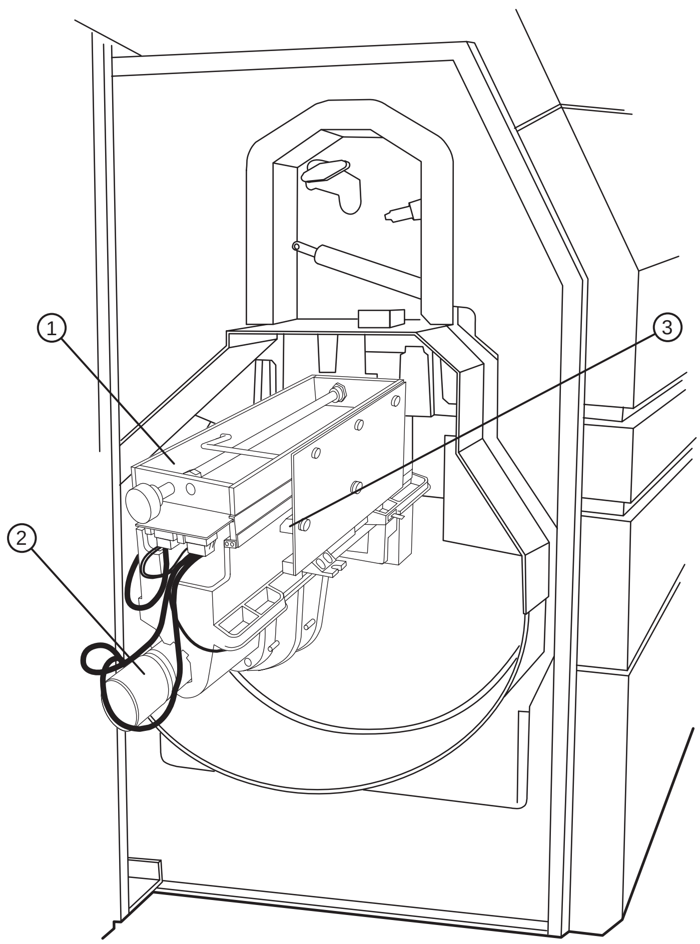


Figure 4-30 Transfer tool and carriage assembly.

①–Transfer tool. ②–Carriage assembly. ③–Magnetic transfer bracket.

13. The magnet retainer bracket moves down to secure the carriage magnets.
14. Tighten both retainer screws. Refer to Figure 4-27.
15. Holding the carriage transfer tool by its handle, unscrew the transfer tool from the system and put it on a flat surface with the transfer tool down.

Carriage Installation from Transfer Tool:

1. Insert the carriage transfer tool pin into the hole on the engine upper structure frame and line up the pin on the transfer tool left rail with the hole in the carriage left rail. Refer to Figure 4-27.
2. As you tighten the transfer tool screw, make sure that the alignment lip on the bottom of the transfer tool right rail is up against the bottom of the carriage right rail.
3. After the transfer tool is secure, make sure that the top surface of the transfer tool rails line up with the carriage rails.
4. Loosen the two (2) retainer screws that hold the magnet bracket in the down position. Refer to Figure 4-27.
5. Move the magnet bracket up and tighten the retainer screws. Refer to Figure 4-30.
6. Loosen the two (2) retainer screws that hold the bearing bracket in the down position. Move the bearing bracket up and tighten the retainer screws.
7. Disengage the two locking pins on the side of the transfer tool. Refer to Figure 4-27.
8. Gently push the carriage assembly from the transfer tool to the system carriage rails.

   Some resistance will be felt when the magnets move onto the rails.
9. Unscrew the carriage transfer tool and remove it from the system. Refer to Figure 4-28.
10. Reverse the removal procedure starting with Step 6 to complete the installation of the carriage assembly.

4.6 Opto-mechanical Removal/ Replacement Procedures

The following describes the opto-mechanical removal/replacement procedures.

4.6.1 Light Shields (Right and Left)

Remove:

1. Open the top cover at the front of the imagesetter.
2. Open the side cover (left and/or right). See Section 4.2.1, Right/Left Side Covers.

3. Pull each of the five (5) latch knobs out and twist them so that they rest outside of the lock slot. Refer to Figure 4-31.

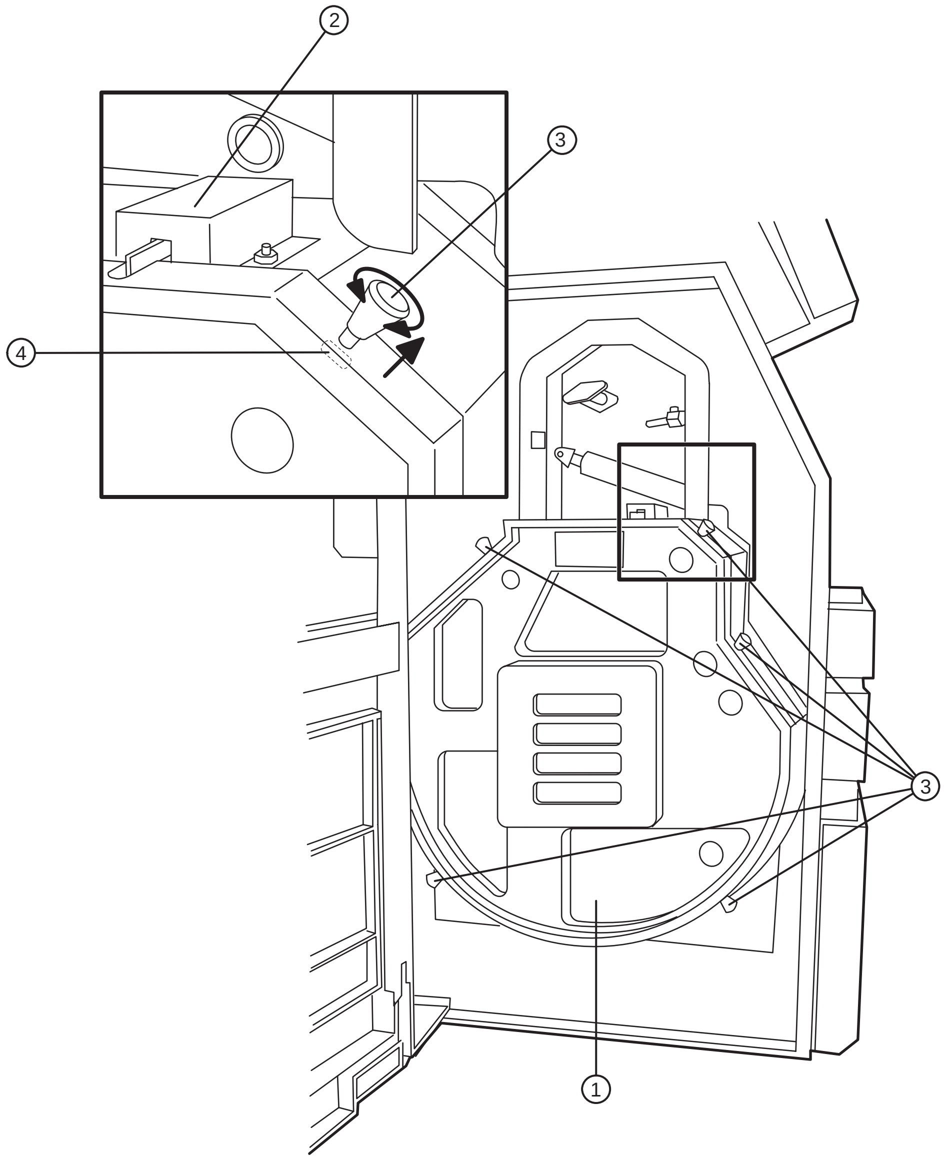


Figure 4-31 Light shield.

①–Light shield. ②–Five latch knobs. ③–Interlock switch.
④–Latch knob lock slot.

4. The light shield on the left requires a twist toward the door to remove. Pull the light shield on the right straight out.

NOTE: When removing the light shield, the interlock switch, located above the shield, automatically shuts off the laser and spin motor.

Replace:

1. Reverse the above removal procedure.

4.6.2 Spin Motor Module (SMM)

Tools Required: 5/32" allen wrench

Remove:

1. Open the left side cover. See Section 4.2.1, Right/Left Side Covers.
2. Remove the left inner light shield by pulling the five latching knobs. See Section 4.6.1, Light Shields (Right and Left).
3. Remove the spin motor signal and encoder cables from the carriage board. Refer to Figure 4-32.

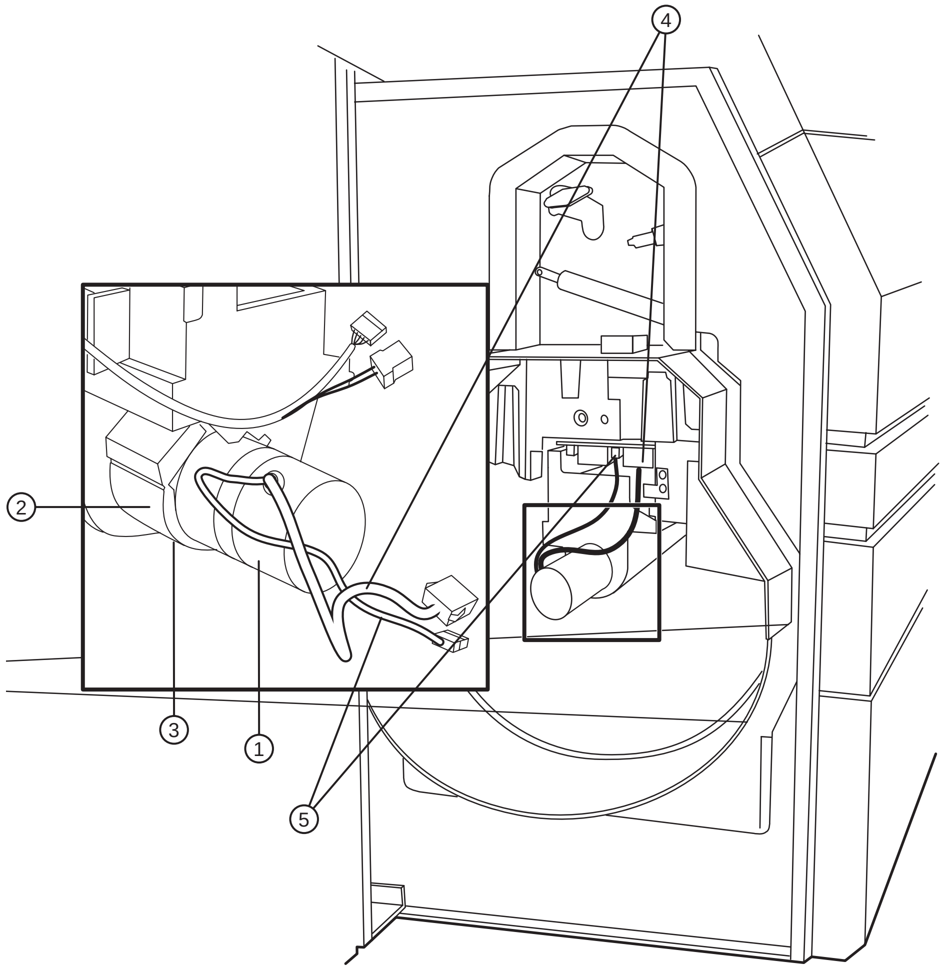


Figure 4-32 Spin motor module (SMM).

①–Spin motor module. ②–Mounting bracket. ③–Three allen screws
. ④–Spin motor cable. ⑤–Spin motor encoder cable.

4. Cut the tie clamps.
5. Loosen the three (3) allen screws that secure the spin motor mounting bracket to the carriage casting. Refer to Figure 4-32.
6. Slide the spin motor out of the mounting bracket. Refer to Figure 4-32.

Replace:

1. Orient the alignment key on the spin motor with the slot in the carriage casting.
2. Slide the spin motor forward through the mounting bracket.
3. Push the spin motor firmly against the front locating pin and tighten the spin motor mounting bracket allen screws.

4. Reverse the removal procedure starting from Step 4 to complete spin motor installation.
5. Turn the system on and launch the AVDIAG program from your PC.

4.6.3 Spot Generation Module (SGM)

Tools Required: Allen wrenches

Remove:

WARNING: Never hold the SGM module by the laser diode assembly. Doing this could cause misalignment of the laser.

NOTE: Each new SGM comes with a sheet of paper that contains the new polarizer, focus home positions, and beam compressor number. These values must be entered in the DEC machine parameters after the SGM is installed.

1. Remove the carriage assembly from the system. See Section 4.5, Carriage Drive Removal/Replacement Procedures.
2. Remove the plastic cover over the SGM assembly.
3. Loosen the two (2) allen screws securing the spin motor bracket to the carriage casting.
4. Remove the spin motor and place it next to the carriage assembly.
5. Remove the motor, sensor, and laser diode cables from the SGM to the carriage board.
6. Remove the three (3) allen screws securing the SGM assembly to the carriage casting.

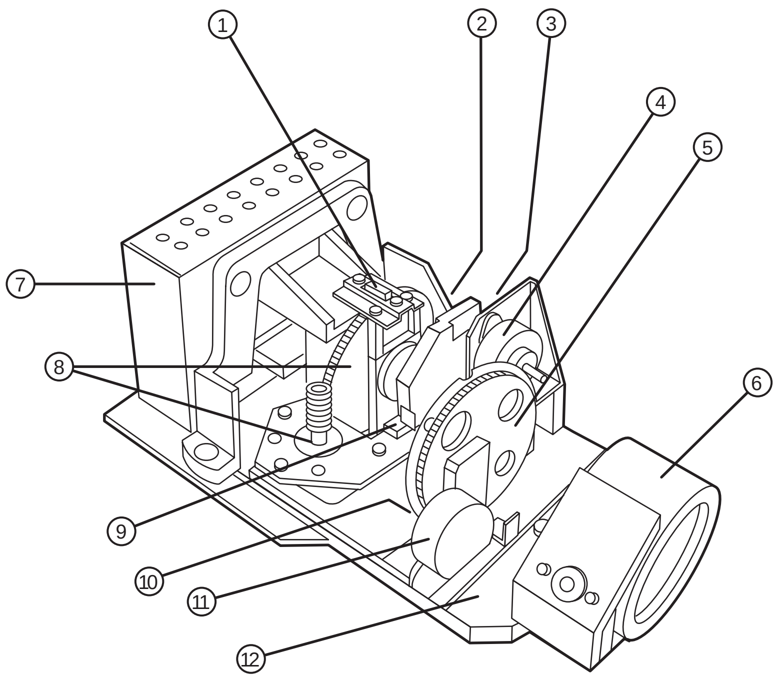


Figure 4-33 Spot generation module (SGM).

①–Polarizer sensor. ②–Beam compressor motor.
③–Beam compression sensor. ④–Weak lens motor.
⑤–Spot size changer. ⑥–Spot forming lens. ⑦–Laser diode mount .
⑧–Polarizer wheel and motor. ⑨–Focus sensor. ⑩–Spot size sensor.
11–Aperture wheel motor. 12–SGM base.

Replace:

1. Reverse the above removal procedure.

4.6.4 Spot Size Sensor

Tools Required: Small flathead screwdriver, cutters

Remove:

1. Remove the carriage assembly from the system. See Section 4.5, Carriage Drive Removal/Replacement Procedures.
2. Remove the sensor shell connector from the Carriage Board.
3. Cut all the tie wraps from the spot size sensor to the sensor connector removed in Step 2.

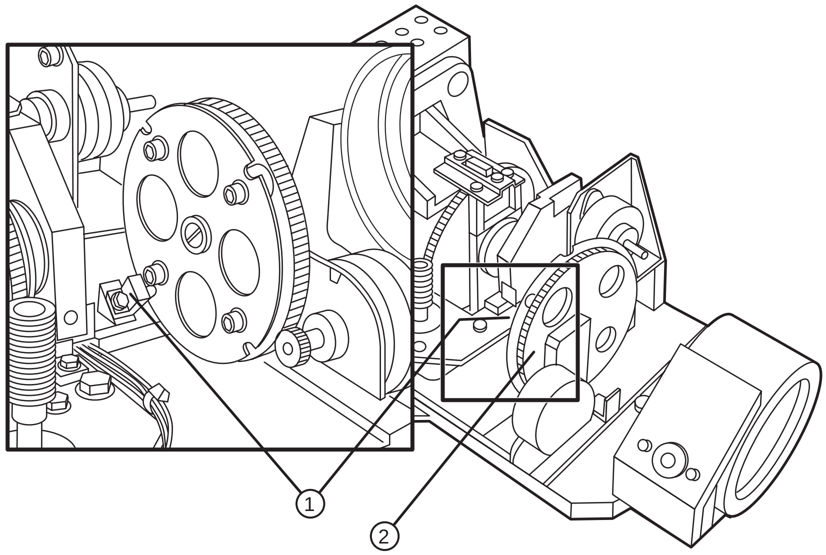


Figure 4-34 Spot size sensor location.

①–Spot size sensor. ②–Aperture wheel motor.

4. Remove the hex screw securing the sensor to the SGM casting. Refer to Figure 4-34.
5. Remove the sensor cable plug from the shell connector removed in Step 2.

Replace:

1. Reverse the above removal procedure.

4.6.5 Polarizer Sensor

Tools Required: Small flathead screwdriver, cutters

Remove:

1. Remove the carriage assembly from the system. See Section 4.5, Carriage Drive Removal/Replacement Procedures.
2. Remove the sensor shell connector from the carriage board.
3. Cut the tie wraps from the polarizer sensor connector removed in Step 2.

4. Remove the two (2) hex screws securing the polarizer sensor to the bracket. Refer to Figure 4-35.

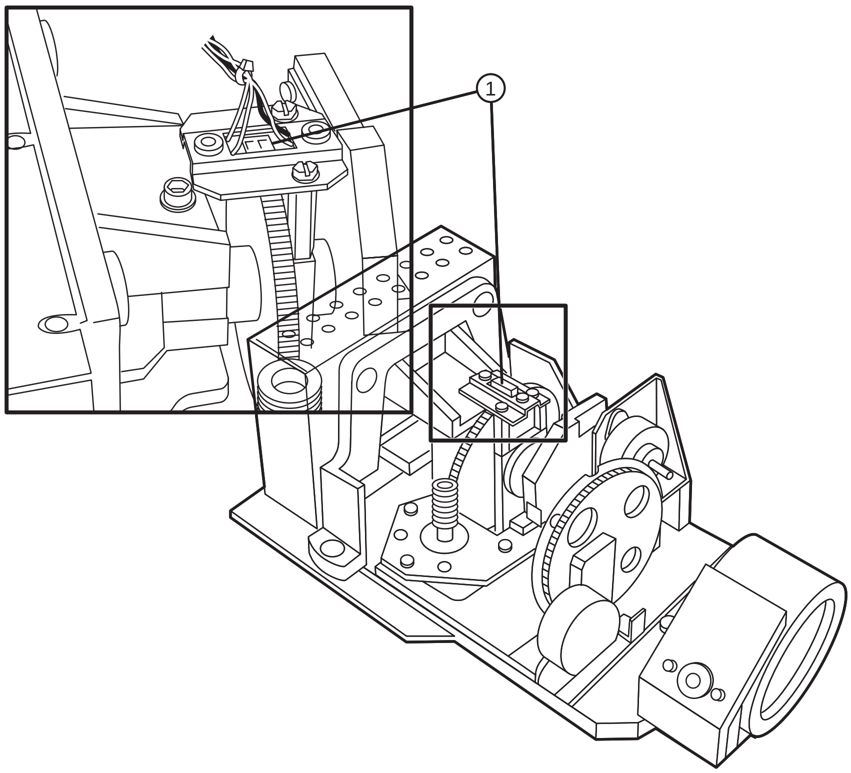


Figure 4-35 Polarizer sensor location.

①–Polarizer sensor.

5. Remove the sensor cable plug from the shell connector removed in Step 2.

Replace:

1. Reverse the removal procedure above.

4.6.6 Beam Compressor Motor

Tools Required: Small flathead screwdriver, cutters

Remove:

1. Remove the carriage assembly from the system. See Section 4.5, Carriage Drive Removal/Replacement Procedures.
2. Remove the motor shell connector from the carriage board.
3. Cut all the tie wraps from the compressor to the connector removed in Step 2.

4. Remove the two (2) hex screws securing the compressor motor to the SGM casting. Refer to Figure 4-36.

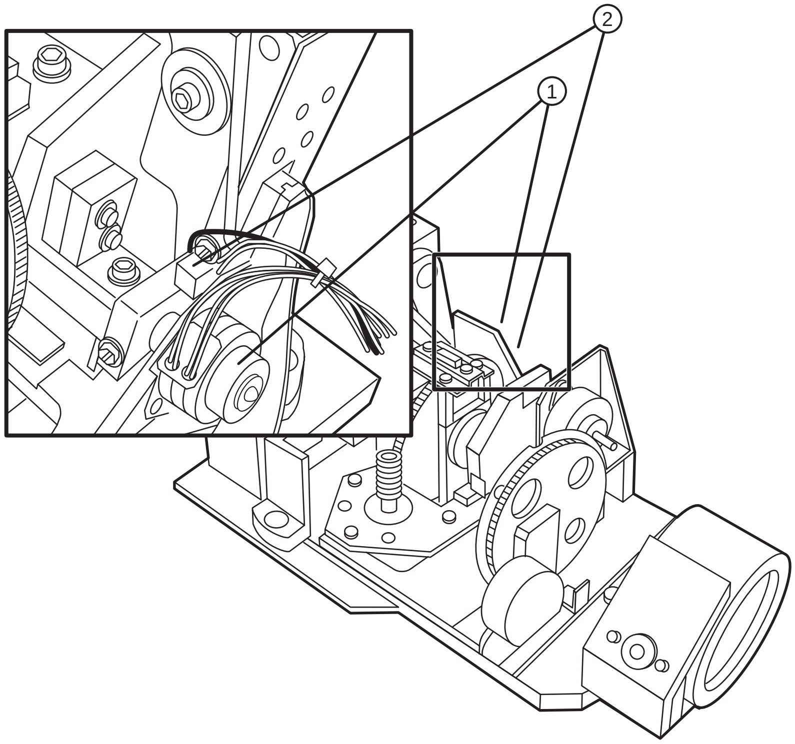


Figure 4-36 Compressor motor location.

①–Beam compressor motor. ②–Beam compressor sensor.

5. Remove the compressor plug from the shell connector removed in Step 3.

Replace:

1. Reverse the removal procedure above.

4.6.7 Aperture Wheel Motor

Tools Required: Small flathead screwdriver, cutters

Remove:

1. Remove the carriage assembly from the system. See Section 4.5, Carriage Drive Removal/Replacement Procedures.
2. Remove the motor shell connector from the carriage board.
3. Cut all the tie wraps from the aperture wheel motor to the connector removed in Step 2.

4. Remove the hex screws securing the aperture wheel motor to the SGM casting. Refer to Figure 4-37.

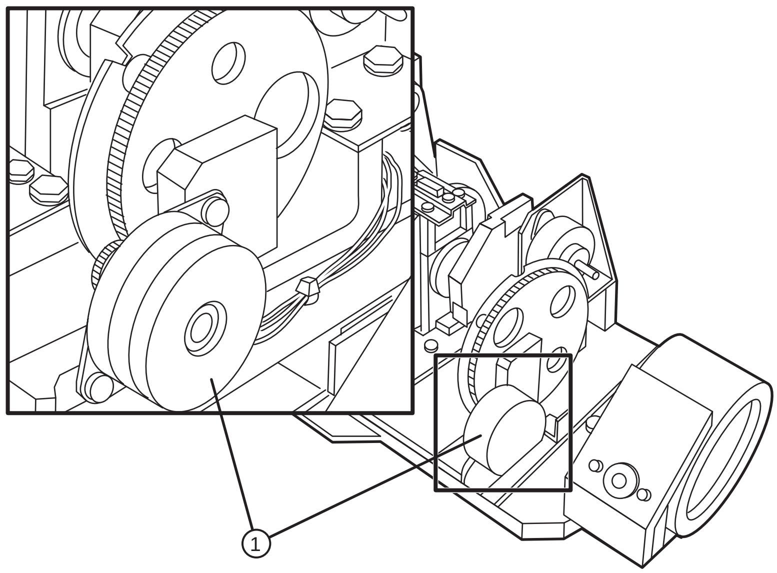


Figure 4-37 Aperture wheel motor location.

①–Aperture wheel motor.

5. Remove the aperture wheel plug from the shell connector removed in Step 3.

Replace:

1. Reverse the removal procedure above.

4.6.8 Weak Lens Motor

Tools Required: Small flathead screwdriver, cutters

Remove:

1. Remove the carriage assembly from the system. See Section 4.5, Carriage Drive Removal/Replacement Procedures.
2. Remove the motor shell connector from the carriage board.
3. Cut all the tie wraps from the weak lens motor to the connector removed in Step 2.

4. Loosen the allen screw securing the lead screw of the motor to the casting.
5. Remove the hex screws securing the weak lens motor to the SGM casting. Refer to Figure 4-38.

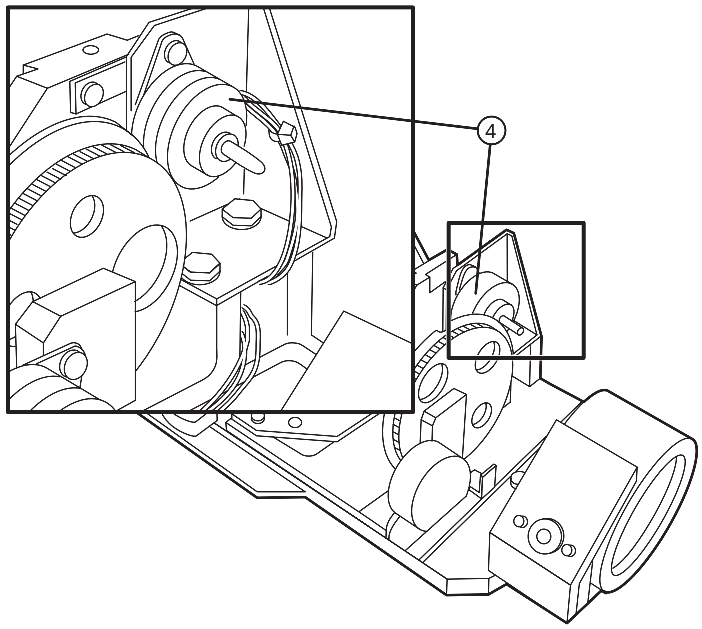


Figure 4-38 Weak lens motor location.

①–Weak lens motor.

6. Remove the plug from the shell connector removed in Step 3.

Replace:

1. Reverse the removal procedure above.
2. Run the FOCUS.FIL file from the PC imager to check the focus adjustment.

4.6.9 Focus Sensor

Tools Required: Small flathead screwdriver, cutters

Remove:

1. Remove the carriage assembly from the system. See Section 4.5, Carriage Drive Removal/Replacement Procedures.
2. Remove the sensor shell connector from the carriage board.
3. Cut the tie wraps from the focus sensor connector removed in Step 2.

4. Remove the hex screw securing the focus sensor to the bracket. Refer to Figure 4-39.

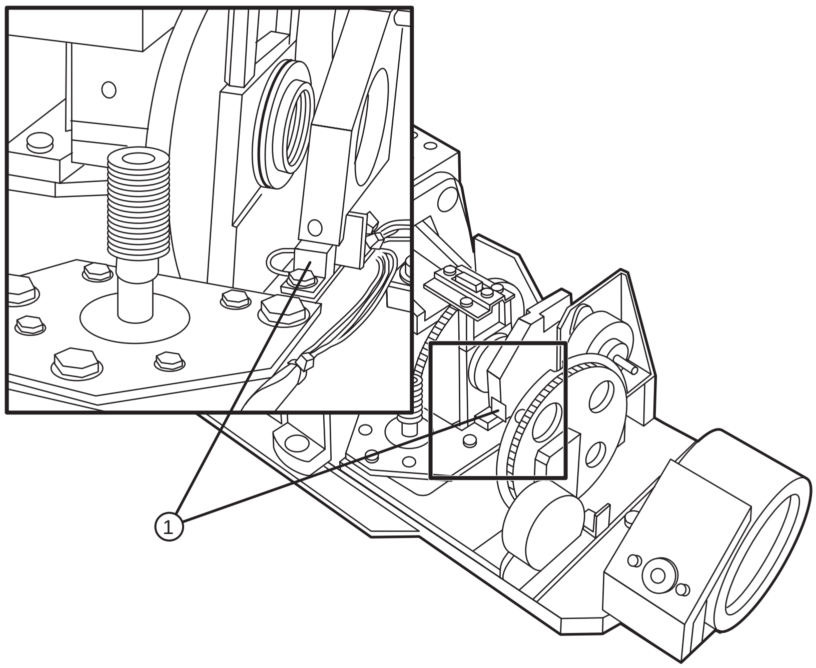


Figure 4-39 Focus sensor location.

①–Focus sensor.

5. Remove the sensor cable plug from the shell connector removed in Step 2.

Replace:

1. Reverse the removal procedure above.
2. Run the FOCUS.FIL file from the PC imager to check the focus adjustment.

4.7 Media Transport Removal/Replacement Procedures

The following describes the media transport removal/replacement procedures. Refer to Figure 4-40 for media transport motor and sensor locations.

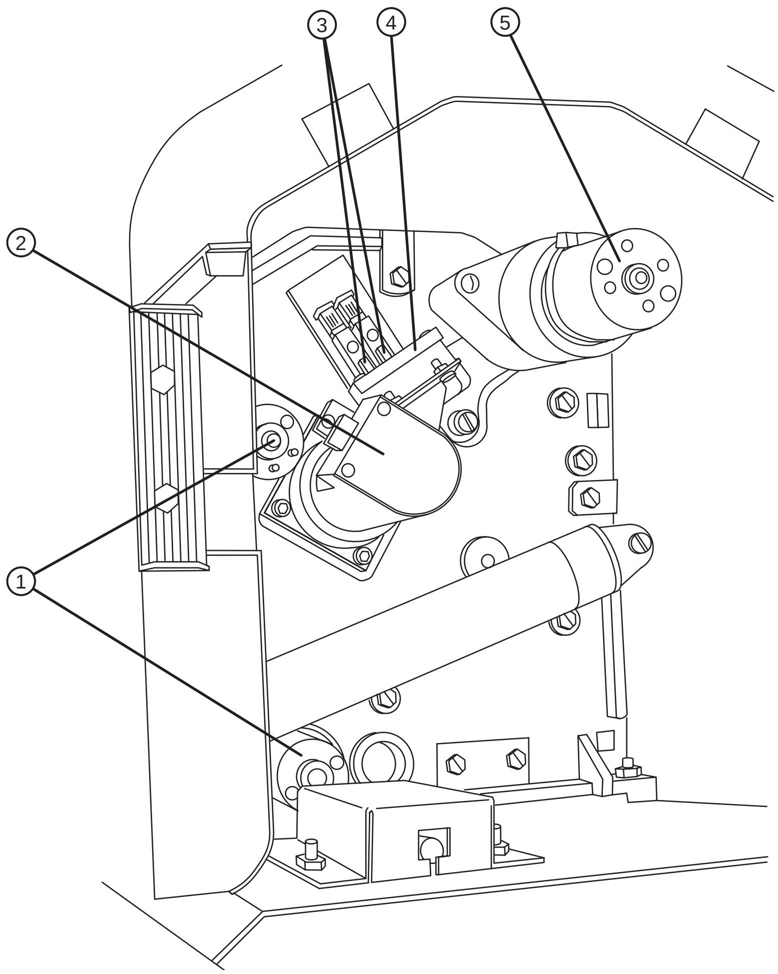


Figure 4-40 Supply motor and sensor locations.

①–Supply cassette A/B rewind motors. ②–Supply drive motor.
③–Spindle A/B position sensors. ④–Flag bracket.
⑤–Supply spindle select motor.

4.7.1 Supply Drive Servo Motor

Tools Required: Allen wrenches, 1/4" nut driver, 5/16" nut driver

Remove:

1. Unload the media from the system.
2. Open the top cover. Refer to Figure 4-41.
3. If the bridge is installed, put the system in light mode and lift the bridge to the up position. Shut the system off before the bridge goes back to heavy mode.
4. Lift up the light shield cover.

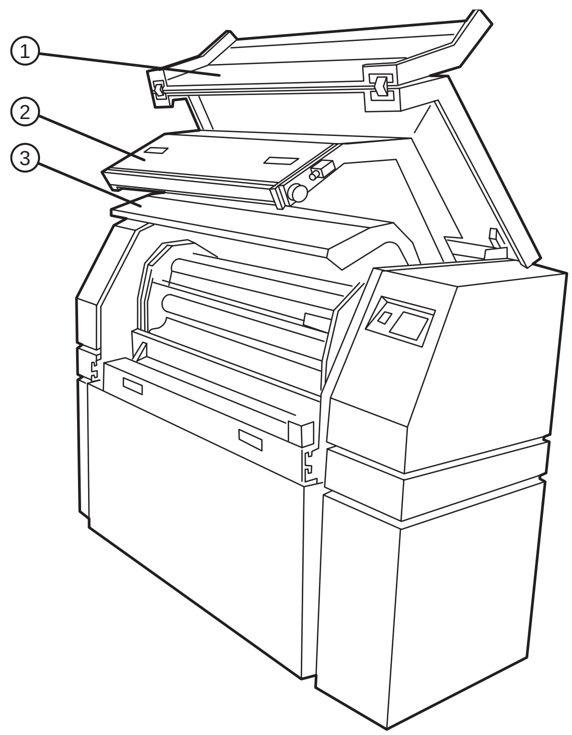


Figure 4-41 Imagesetter outer and inner covers.

①–Top cover. ②–Bridge. ③–Light shield.

5. Remove the supply cassettes.
6. Open the right side cover. Refer to Section 4.2.1, Right/Left Side Covers.
7. Remove the outer light shield. Refer to Section 4.6.1, Light Shields (Right and Left).

8. Release the tie clamps and bracket on the inner light shield (shell surrounding the motors and sensors) that secure the ribbon cables coming from the supply SDM and carriage board. Refer to Figure 4-42.

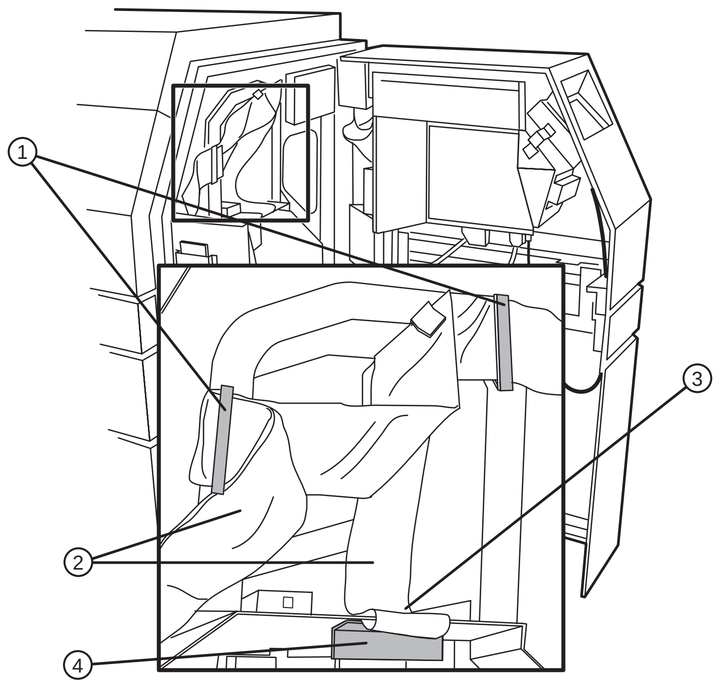


Figure 4-42 Opening the cable clamps and removing the cables to gain access to the supply motors and sensors.

①–Two ribbon cable clamps. ②–Ribbon cables.
③–Lower cable clamp. ④–Bracket.

9. Remove the encoder connector from the supply drive servo motor. Refer to Figure 4-43.

   Note the orientation of the connector for proper replacement.

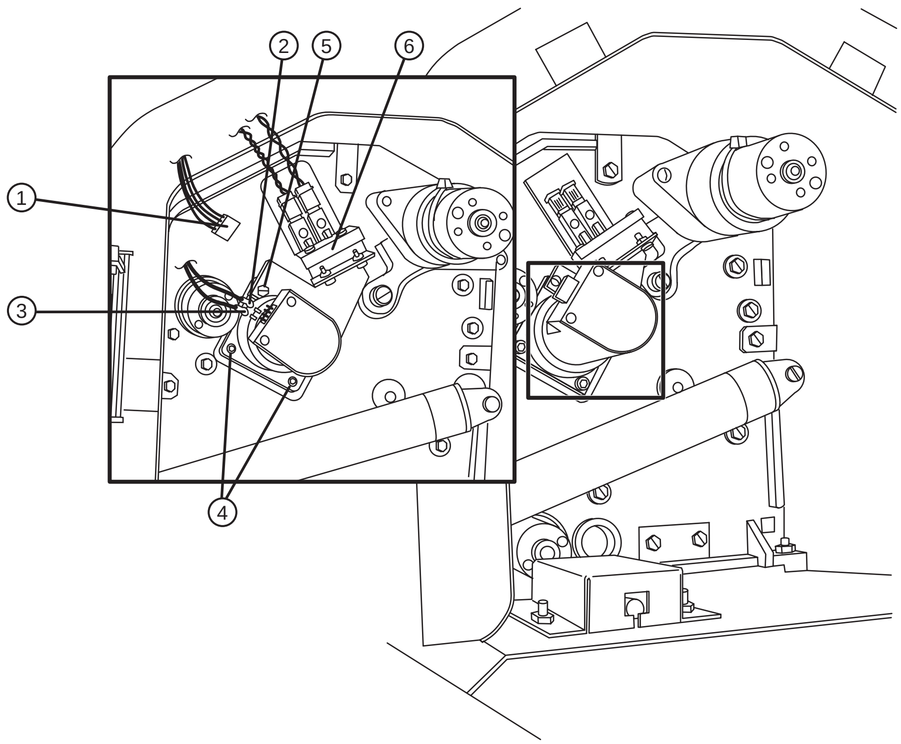


Figure 4-43 Removing the supply drive servo motor.

①–Encoder connector. ②–Red connector.
③–Brown connector. ④–Two 7/64" allen screws.
⑤–Two hex screws. ⑥–Flag bracket.

10. Remove the red wire from Pin 1 and the brown wire from Pin 2 on the motor. Refer to Figure 4-43.
11. Using a 7/64" allen wrench, remove the two (2) allen screws securing the bottom of the motor to the motor bracket. Refer to Figure 4-43.
12. Using a screwdriver, remove the two (2) hex screws securing the top of the motor to the sensor flag bracket. Refer to Figure 4-43.

    The two hex screws have standoffs between the motor and the bracket.
13. Remove the motor and the sensor flag bracket from the system.
14. Remove the allen screw securing the gear to the motor shaft.
15. Remove the gear.

Replace:

1. Reverse the removal procedures to re-install the supply drive motor.

NOTE: Ensure that the supply drive motor gear is positioned in the center of the supply drive roller gear.

2. Turn the system on and launch the AVDIAG program from your PC.
3. Test spindle swap and supply motor.

4.7.2 Supply Cassette A or B Rewind Motors

Tools Required: 3/16" and 1/16" allen wrenches

Remove:

1. Follow the first eight steps in Section 4.7.1, Supply Drive Servo Motor above.
2. Remove the red wire from Pin 1 and the black wire from Pin 2 at the end of the supply motor (A or B) being replaced. Refer to Figure 4-44.

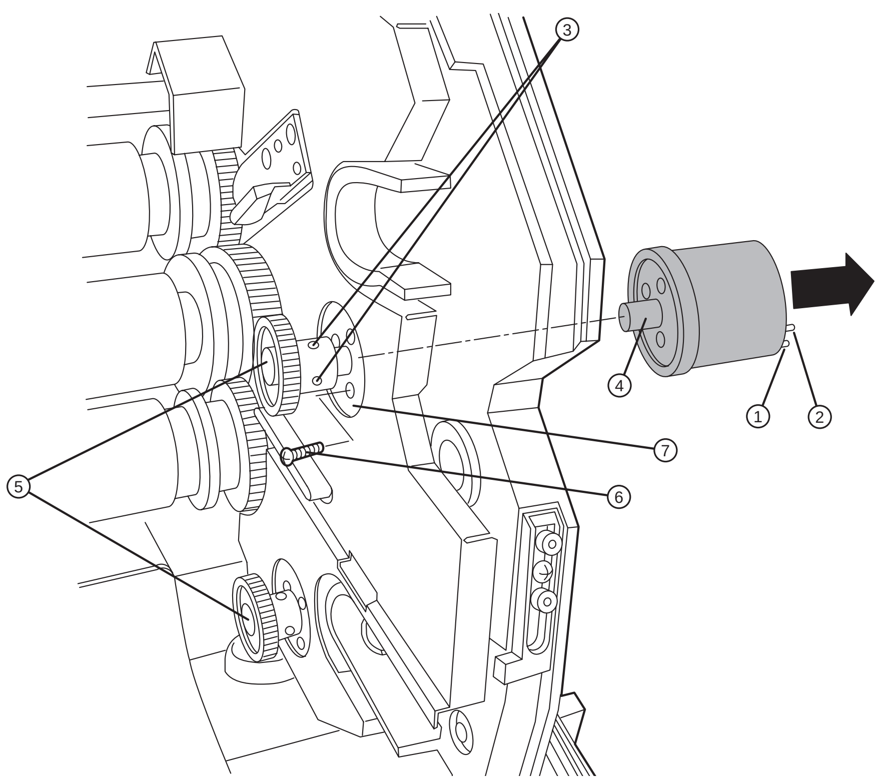


Figure 4-44 Removing the supply cassette A or B rewind motors.

①–Red pin. ②–Black pin. ③–Two 1/16" allen screws. ④–Motor shaft.
⑤–Gear. ⑥–Three 3/16" hex screws. ⑦–Bracket.

3. Remove the two (2) 1/4" hex screws securing the motor to the engine side casting.
4. Loosen the two (2) 1/16" allen screws securing the gear to the motor shaft. Refer to Figure 4-44.
5. Remove the gear from the motor shaft. Refer to Figure 4-44.
6. Using a 3/16" nut driver, remove the three hex screws securing the motor bracket to the motor. Refer to Figure 4-44.

Replace:

1. Reverse the removal procedure to re-install either the supply cassette motor A or B.
2. After installing the gear onto the supply motor, install the cassette and align the motor gear to the cassette gear before tightening the two supply motor gear allen screws.
3. Turn the system on and launch the AVDIAG program from the PC.
4. Test whichever (A or B) motor that was replaced.

4.7.3 Supply Spindle Select Motor

Tools Required: Screwdriver, allen wrench, phillips screwdriver

Remove:

1. Follow the first eight steps in Section 4.7.1, Supply Drive Servo Motor above.
2. Remove the supply spindle select motor cable from the supply SDM board at connector (J).
3. Remove the red wire from Pin 1 and the black wire from Pin 2 at the end of the motor.
4. Remove the three (3) screws securing the inner light shield (shell surrounding the supply motors and sensors) to the imagesetter frame. Refer to Figure 4-45. Pull the inner light shield out enough to expose the coupler housing.

   The coupler housing will have two access holes, one for each set of allen screws. Refer to Figure 4-46. These allen screws secure the motor shaft to the coupler.
5. Loosen one set of allen screws securing the motor shaft to the coupler. Refer to Figure 4-46.
6. Remove the two (2) hex screws securing the motor bracket to the housing. Refer to Figure 4-46.

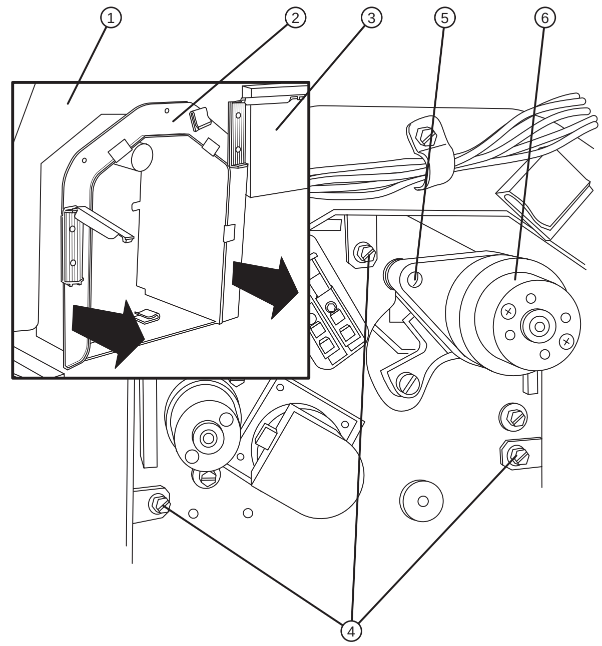


Figure 4-45 Removing the light shield to access the supply spindle select motor coupler screws.

①–Imagesetter.②–Light shield. ③–SDM board. ④–Three light shield hex screws. ⑤–Two mounting screws. ⑥–Supply spindle select motor.

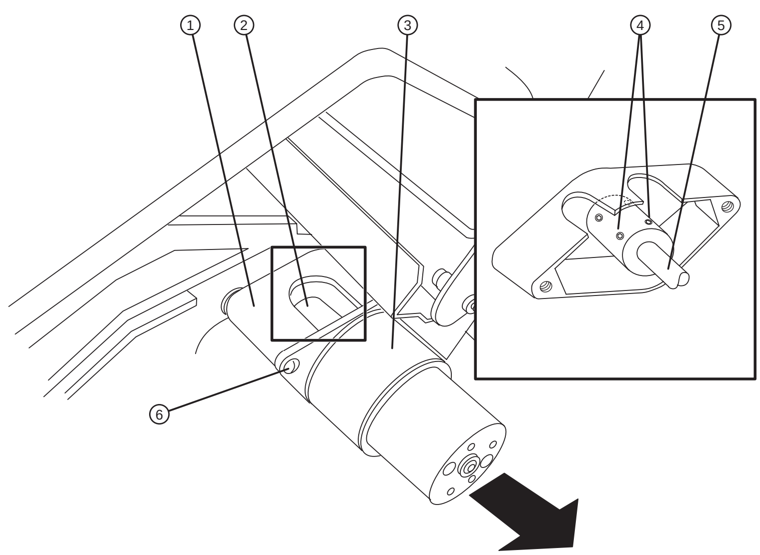


Figure 4-46 Removing the select motor coupler.

①–Coupler housing.②–Coupler.③–Supply spindle select motor.
④–Two coupler allen screws on motor shaft side.
⑤–Motor shaft. ⑥–Two housing screws.

Replace:

1. Reverse the above removal procedure to re-install the spindle position motor.

NOTE: Loctite should be added to the two allen screws on the coupling before they are tightened.

NOTE: Perform the following procedure to make sure that the supply spindle select motor has been installed properly.

2. Open the supply A or B roller. Place a 1 mil shim between the A or B and drive roller disks.
3. Nip the rollers so that the disks touch.

   If you can remove the shim easily, then the supply spindle select motor needs adjustment. Perform the test on both and B spindles on both sides of the unit.
4. Loosen the two (2) select motor housing screws and twist the motor slightly. Tighten the screws.
5. Perform the above test until the shim cannot be removed easily.
6. Turn the system on and launch the AVDIAG program from your PC.
7. Test the motor.

NOTE: The sensor flags may need adjustment.

4.7.4 Supply Spindle Select A/B Sensors

Tools Required: Screwdriver

Remove:

1. Follow the first eight steps in Section 4.7.1, Supply Drive Servo Motor above.
2. Remove the connector from the sensor. Refer to Figure 4-47.
3. Using a screwdriver, remove the hex screw securing the sensor (A or B) to the imagesetter frame and remove the sensor. Refer to Figure 4-47.

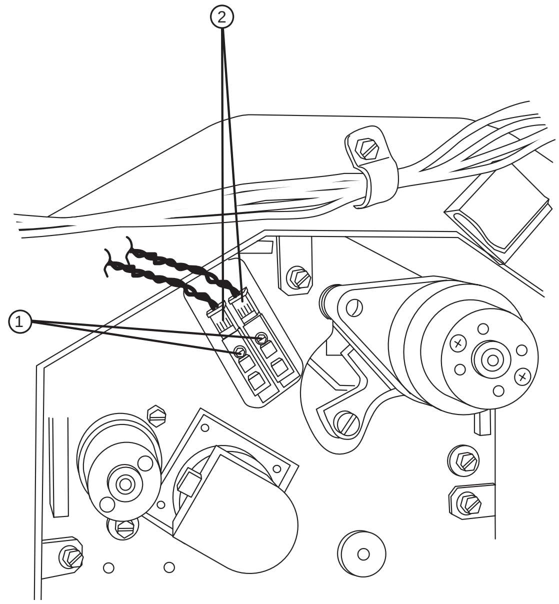


Figure 4-47 Supply cassette spindle A/B position sensors.

①–Two sensor securing screws. ②–Two sensor connectors.

Replace:

1. Reverse the above removal procedure to re-install the sensor.
2. Turn the system on and launch the AVDIAG program from your PC.
3. Select motor A or B to test the sensor.

NOTE: The sensor flags may need adjustment.

4.7.5 Supply Roller Removal and Installation

To Remove the Supply Rollers:

1. Move the nip supply drive roller to the spindle “A” roller.
2. If the system has a bridge, put the bridge in light mode and lift it up. You do not have to disconnect the system from the buffer.
3. Turn the system off.
4. Remove the back supply cassette light shield.
5. Open top supply cassette cover.

To Remove the Bottom Roller:

1. Remove the three screws on each of the left and right inside gray light shields covering the inside castings. The screws to remove these shields are on the opposite side of each casting.
2. Remove the two screws securing the bottom left spring assembly on the left inside casting, which holds the spindle “B” supply cassette bearing in place.
3. Remove the two screws which secure the left and right black brackets, holding the bottom roller bearings in place in the left and right inside casting. The two screws to remove these brackets are located on the opposite sides of the left and right casting.
4. Remove the left and right/bottom and top supply cassette guides. The top left and right guides are secured by two phillips screws on the inside casting and the bottom left and right guides are secured by two allen screws on the inside casting. These four pieces are pinned so that they will not require re-alignment when they are re-installed.

NOTE: Only remove all four supply cassette guides if all three rollers are being replaced.

5. Pull the bottom roller from the left side first and then remove from the system.

To Remove the Top Roller:

1. Remove the two screws securing the left side of bow tie plastic piece that wraps around the shuttle motor rod. Do not remove the bar or loosen the right side (the motor side). Remove the big shoulder screw located below that piece and remove both pieces. The two screws and shoulder screw are located on the outside left casting.
2. Remove the two screws securing each of the left and right black brackets holding the top roller bearings in place in the inside casting. The two screws to remove these brackets are located on the opposite sides of the left and right casting.

3. Move the shuttle motor rod slightly backwards on the left side while removing the top roller from the left side.

To Remove the Center Roller:

1. Remove the supply drive motor with the gear and sensor flag assembly. Caution should be taken not to lose the standoffs for the flag assembly.

NOTE: In new systems the supply motor gear is covered with Loctite, and is difficult to remove from the motor shaft. This is why the entire motor must be removed.

2. Remove one allen screw directly behind the drive roller bearing on the left side. Do not remove or loosen the V-Platen to get to this allen screw.
3. Remove the drive roller from the left side with the metal piece that holds the roller left bearing. You may have to pull hard to get the right side of this roller out because the right bearing sticks to its metal piece on the right side.

Installing the Rollers

Reverse the above directions to re-install. Install the center roller first, followed by the top and bottom roller.

Note: Before installing each roller use a pliers to compress the spring and then put a tie wrap through it so that now the spring is compressed. Only use one tie wrap. If you use two wraps, the spring will not go onto the roller shaft.

1. Compress the spring so that it bends when the tie wrap is installed, and tighten. Even with the spring bent you still should be able to get it on the roller shaft. When installing the bearing on the shaft with the compress spring, the bearing should be in slightly and not flushed or sticking out the end of the shaft.
2. After the roller is installed, cut the tie wrap and remove it from around the spring.
3. Re-install all parts previously removed.
4. Refer to procedure 5.13 to check the adjustment of the supply roller disks and the sensor flag adjustment.

4.8 The Vacuum System

The following describes the vacuum system removal/replacement procedures. Refer to Figure 4-40 for component locations.

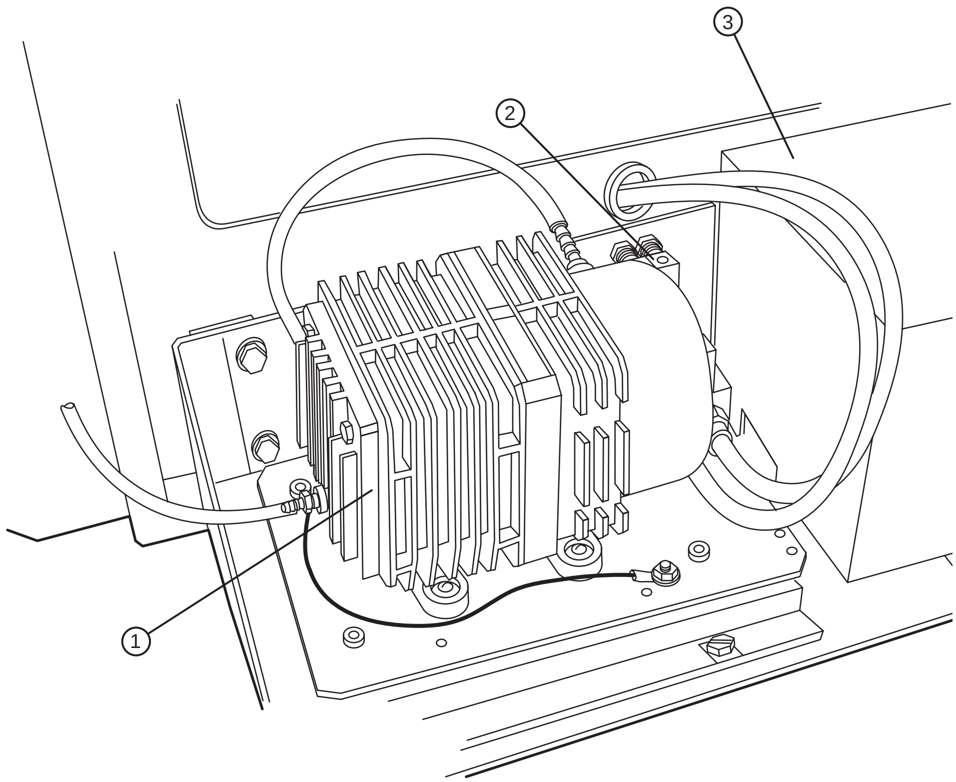


Figure 4-48 The vacuum system components.

①–Vacuum pump.②–Valves. ③–Electronics box.

4.8.1 Vacuum Pump

Tools Required: Flathead and phillips screwdrivers

Remove:

1. Open the right side cover. See Section 4.2.1, Right/Left Side Covers.
2. Remove the two (2) tubing fittings from the pump. Refer to Figure 4-49.
3. Using a flathead screwdriver, remove the two (2) mounting plate screws. Refer to Figure 4-49. Remove the plate with the pump on it.
4. Using a phillips screwdriver, remove the screw holding the grounding wire in place. Refer to Figure 4-49.
5. Turn the pump on its side and disconnect the connector at the bottom of the plate. Refer to Figure 4-49.

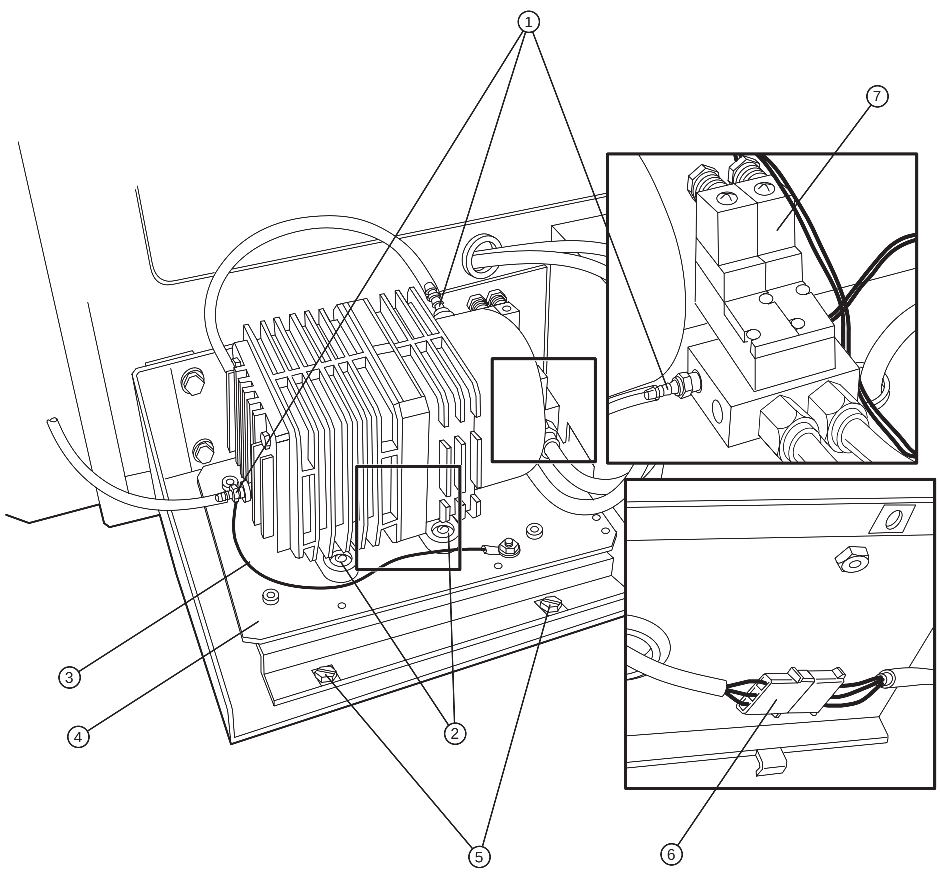


Figure 4-49 Vacuum pump.

①–Tubing fittings. ②–Rubber feet. ③–Ground wire. ④–Mounting plate. ⑤–Two mounting plate screws. ⑥–Connector (under mounting plate). ⑦–Valve assembly.

6. Using a phillips screwdriver, remove the two (2) screws holding the rubber mounts in place.

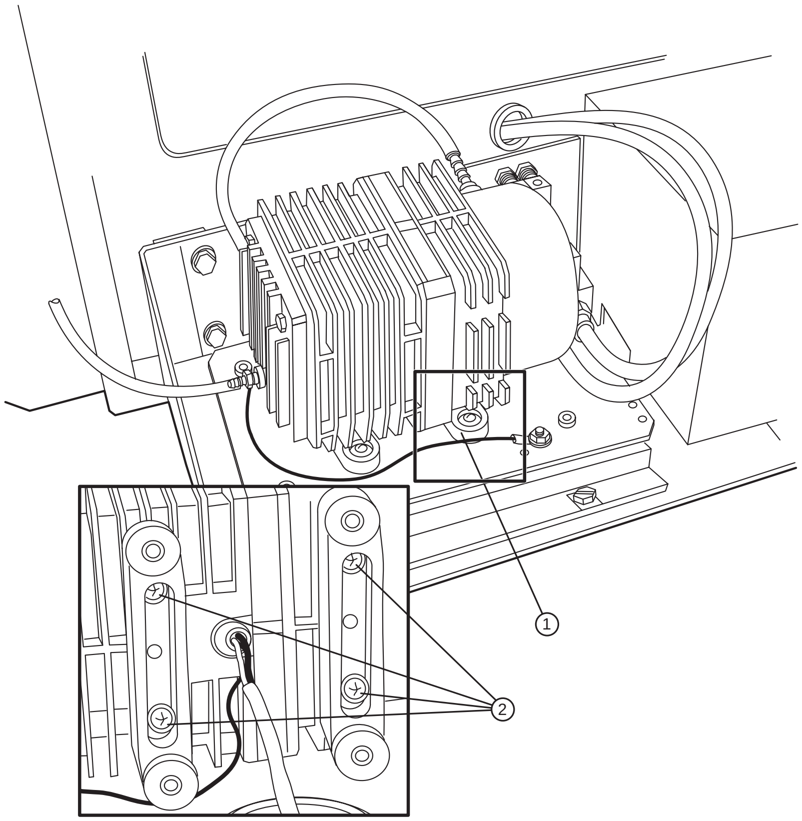


Figure 4-50 Vacuum pump rubber mounts.

①–Rubber mount. ②–Four rubber mount screws.

Replace:

1. Reverse the above removal procedure.

4.8.2 Vacuum Valves

Tools Required: Phillips screwdriver

Remove:

1. Open the right side cover. See Section 4.2.1, Right/Left Side Covers.
2. Using a phillips screwdriver, remove the screw (one each) in the valve tops. Refer to Figure 4-51.

   The valves are located directly to the right of the vacuum pump.

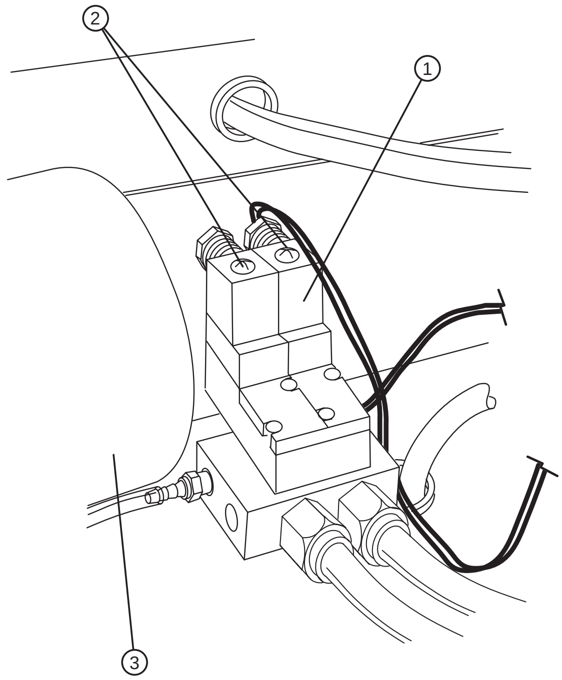


Figure 4-51 Vacuum valves.

①–Valves.②–Screws. ③–Vacuum pump.

Replace:

1. Reverse the above removal procedure.

4.8.3 Vacuum Board

Tools Required: 11/32" socket wrench, needle nose pliars, flathead screwdriver

Remove:

1. Open the right side cover. See Section 4.2.1, Right/Left Side Covers.
2. Remove the three (3) hex nuts, two at the top and one at the bottom, holding the electronics box in place.

   The electronics box is located to the right of the vacuum pump and valves.

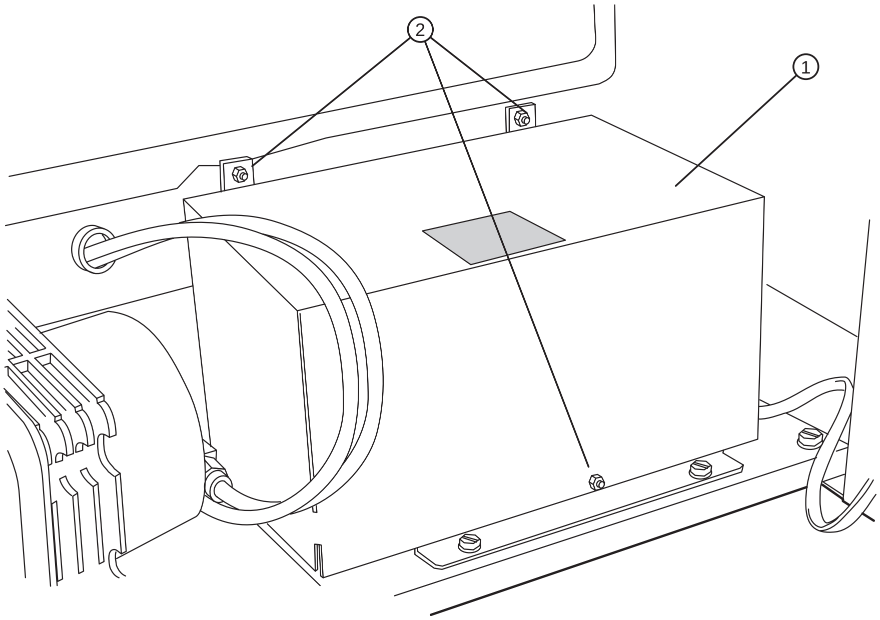


Figure 4-52 Electronics box.

①–Electronics box.②–Three hex nuts.

3. Remove the three (3) connectors from the vacuum board, which is located inside the electronics box on the left hand side. Refer to Figure 4-53.

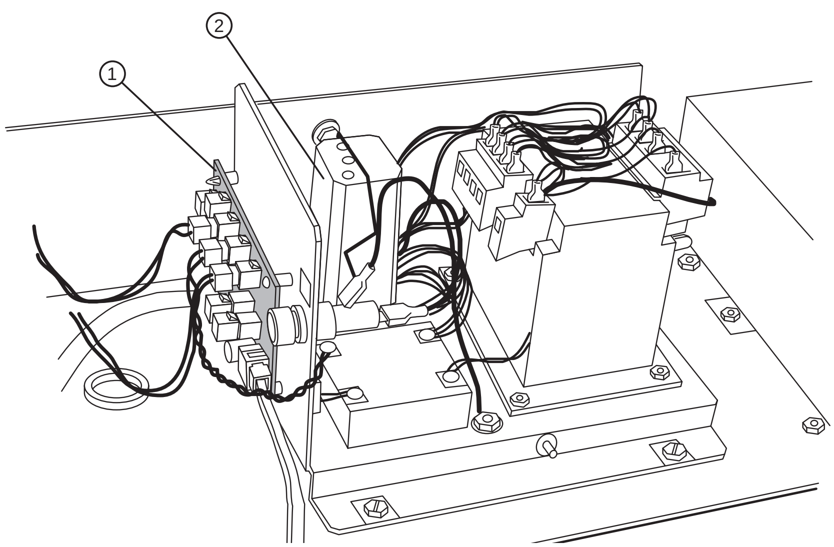


Figure 4-53 Vacuum board.

①–Vacuum board.②–Sensor relay.

4. Using needle nose pliars, squeeze the standoffs in the upper left, lower left, and lower right corners of the vacuum board.
5. Using a flathead screwdriver, remove the screw in the upper right corner of the board.
6. Pull the board free.

Replace:

1. Reverse the above removal procedure.

Chapter 5:
Imagesetter Alignment

5.1 Introduction

This section describes the alignment and adjustment procedures for the Avantra image setter.

This section contains:

- Beginning of Line (BOL) Alignment Procedure
- Exposure Adjustment Procedure
- Carriage Home Position Alignment Procedure
- Focus Alignment
- System Leveling Procedure
- Voltage Check Procedure
- Pulse Width Modulation (PWM) Adjustment Procedure
- Carriage Encoder Alignment Procedure
- Supply Motor Offset Alignment Procedure
- Take-up Cassette Clutch Adjustment Procedure
- Feed Motor Calibration Test
- A/B Roller and Sensor Adjustment
- Slack Loop Test Procedure

5.2 Beginning of Line (BOL) Alignment Procedure

Use the BOL Alignment Procedure to set the correct starting position of the laser beam on the drum surface in the fast scan direction. Position the beam by entering an encoder offset value in the AVDIAG Program. This value determines the distance between the encoder's zero reference signal and the actual start of the BOL. The value is stored in EEPROM on the DEC.

Tools Required: 18" Scale, eye loupe

Coarse Alignment:

1. Open the upper and lower right side doors.
2. Remove the drum light shield.
3. Remove the left carrier shroud to expose the laser beam on the drum surface.
4. Pull out the door interlock switches to allow the spin motor to turn on with the drum light shields removed.
5. Turn the system on and allow the boot cycle to complete.
6. With the PC connected to the diagnostic serial port of the system, launch the AVDIAG program.
7. Enter the Align menu and select SGM-A/B Mod Align. Enter the following parameter values each followed by Beam ON:

   Resolution: 3600

   Gate Start: 0

   Gate Length: 44.5

   BOL Position: Enter an initial value (about 32000)

NOTE: All the above values must be entered even if they are already selected when you entered SGM-A/B Mod Align. If not, the system can not calculate where the correct BOL should begin.

NOTE: If the beam is not visible, either the intensity is too low or the beam is 180° out of position. First, try entering a large BOL position value change (i.e., 10000). At least a partial scan line should appear at this point. If the beam is still not visible, try entering a polarizer value. The polarizer value entered should be close to the coarse density value for the particular resolution currently set.

8. Continue to enter new BOL position values until the scan line centers between the supply and take-up punches on the drum surfaces.

NOTE: A BOL position value change of 1000 represents an (approximately) one (1) inch movement on the drum's surface. Lowering the BOL position value moves the scan line counter-clockwise.

9. The BOL position value is temporary. After determining the correct value, it must be stored in the DEC's EEPROM (DEC Machine Parameters).
10. Press ESC to exit the SGM-A/B Mod Align menu.

NOTE: If the resolution needs to be changed, all parameters must be re-entered and the Beam On must be selected again. This is to recalculate the parameters for the new resolution. If not done, unpredictable BOL positions can be expected.

11. Select DEC Machine Parameters.

    The following dialog appears:

    Loading DEC EEPROM Machine Parameters.
12. Select Y in the dialog box to load the parameters into memory.
13. After loading completes, select DEC Image/Focus. cursor down to the BOL Offset parameter field and press ENTER. Enter the new BOL offset value determined in Step 8 and press ENTER.

    The value loads into EEPROM.

Fine Alignment:

NOTE: Check the Distance to Punches parameter in the Feed Amount Screen prior to running copy. The parameter could effect the starting point for BOL.

1. Turn the system off. Insure all covers and shields are in place. Turn the system back on.

   The system loads and uses the new BOL offset value from EEPROM.
2. Connect the system’s Agfa Print Engine Interface Standard (APIS) cable to the PC imager board in your PC.
3. Start the PC Imager from the PC.

NOTE: Refer to the *PC Imager User's Manual* (P/N 580024-001) for detailed information on running this utility.

4. Enter the Image menu.
5. Select the Test Files sub menu.
6. Select the SCALEFID.CON file and press ENTER.

   The test file should now image.
7. Press the Feed/Cut icon on the Avantra's operator's control panel (OCP).
8. Remove the take-up cassette and develop.
9. Measure the distance from the first line imaged to the center of the middle round hole punched in the fast scan direction.

   The distance should be 0.48" +/- 0.01". Draw a line through the center of the punched hole to make measuring easier.
10. If the BOL-to-punch distance is out of specification, fine adjust the BOL offset value. Use the following formula/example:

    0.48 - Actual BOL-to-Punch distance = Amount out
    Amount out / .001 = BOL Offset units to be added/subtracted

    Original BOL Offset Value - 22,000
    0.48 - 0.72 = -0.24
    -0.24 / .001= -240
    New BOL Offset Value - 22,000 + (-240) = 21,760
11. Enter the new BOL offset value using the AVDIAG Program and rerun the scale file.
12. Measure the copy again to insure BOL-to-punch distance is correct.
13. Re-adjust as required.

5.3 Exposure Adjustment Procedure

Use the Exposure Adjustment Procedure to set the exposure to a range suitable for imaging both text and graphics. This procedure runs the exposure array for all four resolutions.

Tools Required: Densitometer (must be able to measure dot gain)

Steps:

1. Connect the system APIS cable to the PC Imager board in your PC.
2. Turn the system on and wait for it to complete the boot cycle.
3. Launch the PC Imager program from your PC.
4. Select Image and then Special Arrays.

5. Enter the following Information:

Resolution:	3600
Density Start (Enter Starting Density):	Inc. 5
Resolution:	2400
Density Start (Enter Starting Density):	Inc. 5
Resolution:	1800
Density Start (Enter Starting Density):	Inc. 5
Resolution:	1200
Density Start (Enter Starting Density):	Inc. 5

6. Press ESC to exit out of this menu.
7. Select Image and then Test Files.
8. In the test file menu select EXP4RES.FIL and press ENTER.

   The Avantra now images all four resolutions.
9. When imaging completes, select the Feed/Cut Icon on the Avantra's OCP.
10. Remove the take-up cassette and develop.
11. Using the densitometer, select the best 50% dot with a Dmax. between 3.8 to 4.2 for all four resolutions.
12. Enter the new density values in the Cassette Menu on the Avantra control panel.

5.4 Carriage Home Position Alignment Procedure

Use the Carriage Home Position Alignment Procedure to set the starting position of the carriage assembly on the drum surface in the slow scan direction. Position the carriage by entering a carriage home value in the AVDIAG program under the DEC Machine Parameters. This value determines the distance between the carriage limit sensor and the actual start of the image on the drum. The value is stored in EEPROM on the DEC.

Tools Required: 18" Scale, eye loupe

Steps:

1. Turn the system on and allow the system to boot the application software.
2. Connect the systems APIS cable to the PC Imager board in your PC.

3. Start the PC Imager utility from the PC.

NOTE: Refer to the *PC Imager User's Manual* (P/N 580024-001) for detailed information on running this utility.

4. Enter the Image menu. Select the Test Files sub menu. Select the Scale.fil file and press ENTER.

   The test file should now be imaging.

5. Press the Feed/Cut Icon on the Avantra's OCP.
6. Remove the take-up cassette and develop.
7. Measure the distance from the edge of the media to the first line imaged in the fast scan direction.

   The distance should be (0.15" +/- 0.01).

8. If the carriage home position is out of specification, adjust the carriage home value. Use the following formula/example:

   0.15 - Actual start of image distance = Amount out
   Amount out / .00041 = Carriage Home value units to be added/subtracted

   Original Carriage Home Value - 1500
   0.15 - 0.45 = -0.30
   -0.30 / .00041 = -731.7 (-732)
   New Carriage Home Value - 1500 -(-732) = 2232

NOTE: To move the image closer to the edge of the media, the carriage home value must be raised.

9. Launch the AVDIAG program from your PC.
10. Select Align and then DEC Machine Parameters.
11. Select Y to load DEC Machine Parameters to memory.
12. Select DEC (Image/Focus) and cursor down to the Carriage Home parameter field and press ENTER.
13. Enter the new carriage home value that was determined in Step 8 and press ENTER.

    The value is now loaded into EEPROM.

14. Power cycle or reset the system (makes the imagesetter software read the new EEPROM values) and rerun the scale file.
15. Measure the copy again to insure that the start of image is correct.
16. Re-adjust as required.

5.5 Focus Alignment

Use the Focus Alignment Procedure to establish the correct position of the weak lens (focus lens), which properly focuses the laser beam on the drum surfaces. Position the weak lens by entering a focus home position value in the AVDIAG program. This value is based on 4 mil thick media. Other media thickness focus values derive from this base value automatically when selected from the control panel. The focus home value is stored in EEPROM on the DEC.

Tools Required: Eye loupe

NOTE: The density must be correctly set before adjusting the focus. The focus adjustment must be done in 3600 DPI.

Steps:

1. Connect the PC to the Avantra DEC board serial port. Connect the Avantra APIS cable to the PC Imager board in your PC.
2. Launch the AVDIAG program from your PC.
3. Select Align and then DEC Machine Parameters.

   The following dialog appears:

   Loading Dec. EEPROM Machine Parameters.
4. Select Y in the dialog box.

   The machine parameters now load up to the PC.
5. When the load process completes, select DEC (Image/Focus). Write down the values for the focus position.
6. Press ESC.
7. Select Exit and then Soft Reset.
8. Launch the PC Imager program from your PC, and type in the system serial number.
9. Select Image and Test Files.
10. Select FOCUS.FIL.

    This file will now image on the Avantra.
11. When the file is finished, press ESC.
12. Select the Feed/Cut Icon on the Avantra control panel.
13. Remove the take-up cassette and develop.
14. Lay the output copy on a light table with the horizontal bars going left to right.

The output copy consists of two focus patterns (vertical and horizontal) divided by five horizontal black bars. The top pattern is the vertical focus and the bottom pattern is the horizontal focus. See Figure 5-1.

The header tells you the starting point, which is defaulted to -280 for each focus pattern. The increment is defaulted to 40. These can be changed in the Special Arrays menu in PC Imager; however, these values should work for most systems. Do not change the 120 value.

15. Before reading the output, mark each horizontal line set using a pen.

    The first set of line patterns above the five black horizontal bars is -280. Each set of line patterns above -280 has its value decreased by the increment 40; i.e., the second set of line patterns above -280 would be -240, the third -200 until the top set, which should be +80, is reached.

16. Mark the bottom set of line patterns in the same way.

    The bottom set of line patterns is -280. Mark each set of line patterns until the top set is reached, which should be just below the five black horizontal bars. This last set should be +80.

17. Make five readings for each focus pattern for a total of 10 readings.

    Start with the top (vertical) pattern. Every place there is a black horizontal bar (starting at -280) move up until you get to a set of line patterns that are equal. The patterns start out dark to light but eventually come equal. If the crossover point is between two sets of pattern lines then choose the value between them. For example - if the crossover happens between -160 and -120 then choose -140. Write this value on the output copy. Every place there is a horizontal black bar you must do a reading. You should now have five numbers.

18. Do the same for the bottom (horizontal focus) pattern. Start at the bottom and read up. Again make five readings, one at each horizontal black bar.

NOTE: Note: You may notice that the crossover occurs twice when doing the horizontal focus. The first one occurring close to -280. This set of patterns will be dark, but they do look equal. This is because both are out of focus. The crossover should occur further up the focus pattern.

    When completed you should have ten numbers.

19. Add the 10 numbers and divide by ten.

    The number derived is the new focus position value. This value, if different than the one in Step 5, must be loaded into the systems Dec. Machine Parameters.

20. Exit PC Imager and repeat Steps 2 to 5 above.
21. Cursor to focus position and enter new focus position number from Step 19.
22. Press ESC. Exit AVDIAG with a Soft Reset.

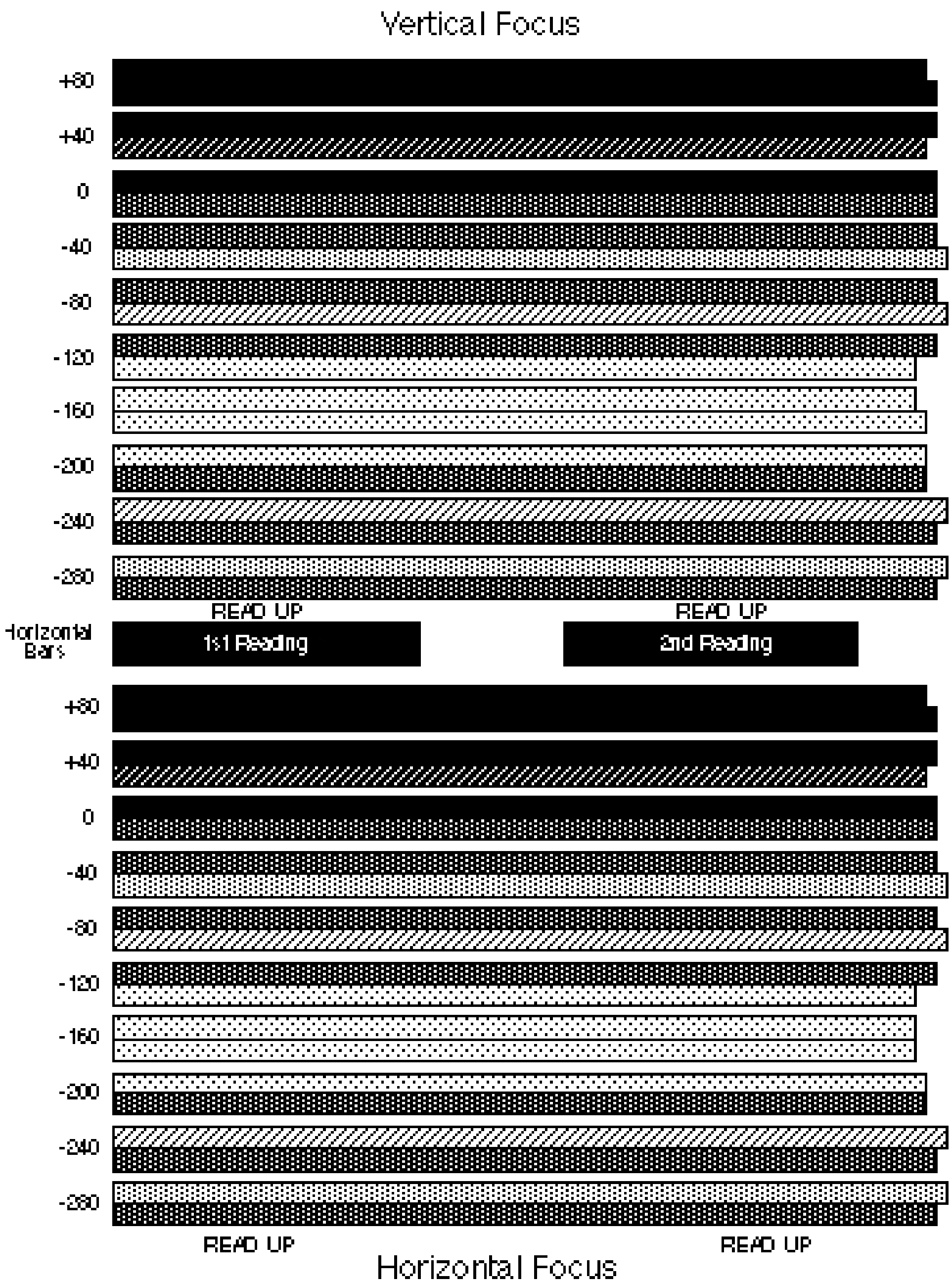


Figure 5-1 Vertical and horizontal focus.
(These patterns are only a simulation.
They are meant to be used as a guide in selecting a correct value.)

5.6 System Leveling Procedure

Whenever installing or moving a system to a new location, perform the following procedure to ensure that the system is level.

CAUTION: An out-of-level system can cause imaging artifacts in output copy.

Tools Required: Adjustable wrench, level

Steps:

1. Open the top cover.
2. Open the supply cassette compartment door.
3. Lower the four (4) leveling feet so that they all make contact with the floor.
4. Place an accurate level on top of the take-up cassette platform.

   The recommended level for this procedure is a Starrett 8" bench level or equivalent. The sensitivity of this level is .003"/div, 12" from the end of the level.
5. Using the adjustable wrench, adjust the appropriate leveling feet on either end of the system to raise the end that is low. Monitor the level while adjusting the feet.

   CAUTION: The system can not be out of level by more than 1/3° or .067 in/ft. This translates to approximately .26" from one leveler to the other.
6. Connect the systems APIS cable to the PC Imager board in your PC and launch the PC Imager program.
7. Run a 50% tint PC (pseudo-continuous) test file.

   Before running the test file, the start/stop parameters must first be set to induce a longer stop delay. Change the parameters as follows:

   a. Under the Image menu, select Start/Stop.

   b. Set the Stop Length parameter to 400. This value induces an eight (8) second pause during each delay.

   c. Under the Image menu, select Test Files.
8. Select the 50% Tint PC file and press ENTER.
9. Inspect the output copy, looking for white gaps or overlapping images.

   If the copy shows this type of artifact, go back to Step 4 and recheck the system for a level condition.
10. Readjust the leveling feet as necessary, and run the test file again to ensure that the system images correctly.

5.7 Voltage Check Procedure

Use the Voltage Check Procedure to insure that the correct voltages are being supplied to the electronics of the system.

Tools Required: Digital voltmeter

Steps:

1. Open the right side doors. Refer to Section 5.2 on page 5-3 in *Section 5: Component Removal/ Replacement Procedures*.
2. Remove the electronics enclosure cover. Refer to Section 5.3 on page 5-5 in *Section 5: Component Removal/Replacement Procedures*.
3. The voltage measurements are taken across the appropriate capacitor for each voltage (except the -5.2 which is taken across a diode). Using a digital voltmeter, check the voltages on the DEC at the following locations:

Location	Voltage	Range
C248	+5 Volts	4.9 to 5.2
C253	+12 Volts	11.9 to 12.3
C272	-12 Volts	-11.9 to - 12.3
C258	+24 Volts	23.0 to 25.0
CR2	-5.2 Volts	-5.1 to -5.3

5.8 Pulse Width Modulation (PWM) Adjustment Procedure

Run the Pulse Width Modulation Test to check dot gain.

The Pulse Width Modulation Test was designed to run with AGFA film only. For other vendors use the densitometer to select the best 50% dot screen and then select the number to the left.

Tools Required: Densitometer (must be able to measure dot gain), light table

NOTE: All four density settings must be set up correctly before running the Pulse Width Modulation file.

Steps:

1. Connect the system APIS cable to the PC Imager board in your PC.
2. Turn the system on and wait for it to complete its boot cycle.
3. Launch the PC Imager program from your PC.

4. Select Image and then Test Files.

NOTE: On new releases of the PC Imager software you can run all four resolutions of PWM files at the same time by running the PWM4UP30.FIL file.

5. Select PWM@12.FIL.

   The system images the 1200 DPI PWM file.

6. When the above file finishes, run:

   PWM@18.FIL

   PWM@24.FIL

   PWM@36.FIL.

7. When the above three files finish, press the Feed/Cut Icon on the Avantra control panel.

8. Remove the take-up cassette and develop the film.

9. Place the output copy on a light table.

   Each PWM file will have three separate exposure patterns. The reference exposure pattern on the right was run using that resolutions density. The resolution and the density value is in the header. The other two reference exposure patterns were run using that resolutions density + or - the value next to it. This number changes depending on the resolution. See Figure 5-2.

   The starting value (40) and the increment value (20) are the defaults and can be found in the Header. These values can be changed in PC Imager under Special Arrays. The starting value (40) is at the bottom row of the pattern and increments by 20 until the top row reads 160.

10. Mark each row before proceeding.

    Looking at the reference exposure pattern on the right under the Dot Balance column, you should see the square dot patterns equalize as you move up the pattern. When they become equal this is the PWM value for that resolution. If they appear to become equal between steps, then use half the increment between those two steps.

    If the square dot patterns never become equal, this means that the density is either to high or to low. Check the other two reference exposure (+/-) patterns to see if there is a dot pattern that is equal. This tells you in what direction (+/-) to move the density. Change the density and re-run that PWM file. The value picked should come from the reference exposure pattern and not the reference exposure +/- patterns.

11. Check the other three PWM files.

    When completed you should have four values, one for each resolution.

    NOTE: Some of the text, especially the PWM@18.FIL, does not line up correctly with the patterns. Look at one of the other PWM files for correct positioning of text.

12. Exit the PC Imager program and launch the AVDIAG program from thePC.
13. Select Align and then DEC Machine Parameters.

    The following dialog appears:

    Loading Dec. Machine Parameters.

14. Select Y in the dialog box to load the parameters to memory.
15. Select DEC (Image/Focus) and move the cursor down to change the PWM values selected in Steps 9 and 10 for all four resolutions.
16. Press ESC.
17. Exit AVDIAG with a soft reset.

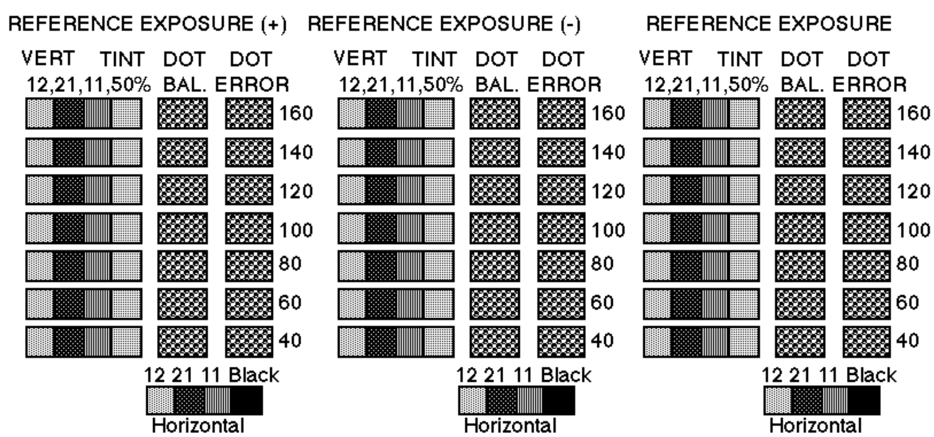


Figure 5-2 Reference exposure patterns.
(These patterns are only a simulation.
They are meant to be used as a guide in selecting a correct value.)

5.9 Carriage Encoder Alignment Procedure

Use the Carriage Encoder Alignment Procedure to normalize the A and B encoder signals from the analog (velocity) encoder. Normalizing the A and B encoder signals reduces the velocity error signal injected into the carriage from the encoder, improving imaging performance.

Perform the alignment by executing the Carriage Align Test contained in the AVDIAG Program. This test samples the A and B encoder signals while the carriage moves at several different speeds. The test takes the minimum and maximum gain and offset values for each signal and averages them together. The resulting numbers can then be loaded into the DSP parameter list in EEPROM. The system reads these values at boot-up and uses them while imaging.

Tools Required: None

Steps:

1. Connect the PC to the diagnostic serial port of the system.
2. Turn the system on and allow the boot cycle to complete.
3. Launch the AVDIAG Program from your PC.
4. Select ALIGN and then Carriage Align and press ENTER.

   A message appears warning that the test modifies the DSP machine parameters and queries about continuing.
5. Press Y.

   The test starts running and takes approximately 80 seconds to complete. When the test completes, the results are displayed. A prompt asks if you wish the previous values to be overwritten.
6. Press Y to load the values or press N to exit the test without saving the new values into EEPROM.

5.10 Supply Motor Offset Alignment Procedure

Use this procedure to set the supply motor current offset. The electronic driver for the supply feed motor acts differently when driving in either of the two directions (spindle A versus spindle B). By performing the following alignment procedure and entering the calculated offset, the software minimizes the differences and makes the feeds from either spindle the same.

Steps:

1. Turn the system on and unload any media from the system.

2. Remove all supply cassettes.

NOTE: It does not matter which way the spindle selector is left; toward A or B works equally as well.

3. Connect the serial cable from the imagesetter to the PC, and launch the AVDIAG Program from your PC.
4. Select Align and then DEC Machine Parameters.

   The following dialog appears:

   Loading Dec Machine Parameters into memory.

5. Select Y in the dialog box.
6. When loading completes, select DEC (Media).
7. Set the S-Feed Current in the second column (for FILM/Plate 3-5.5, M4-Max) to the lowest setting for the S-Feed Current used on paper (Min-MP).

   Make a note of the previous setting so that it can be restored at the end of this procedure.

8. Select Align and then SGM-A/B Mod Align.

   Two commands appear at the bottom of this menu. Use the commands to turn Modulation on and off, and to set the S-Current Offset field. This field has a range of -15 to +15.

9. Start with a value of 0 in the S-Current Offset field.
10. Turn Modulation on by first moving the cursor with the arrow keys until the ON field highlights, then press ENTER.

    The imagesetter drives the supply feed motor in alternating directions, changing rapidly.

11. Observe the action of the feed rollers.

    The rollers will be rotating back and forth. If either direction is more powerful than the other, you will end up with a net movement in one direction. The objective is to make adjustments to the S-Current Offset field to minimize the differential movement. It is easiest to do this by putting a mark on one of the rollers.

12. Note the direction of the overall movement of the rollers.

    If the bottom roller moves in the direction that would move media back into the supply cassette, make a negative field adjustment. Make a positive field adjustment, if the bottom roller moves in the direction that pushes the media into the drum area.

13. Turn off the Modulation, make the field adjustment, then turn the Modulation back on. Repeat this process until you have the setting that causes the least overall movement in the rollers.

14. Once this is complete, go back into the Machine Parameters and restore the S-Feed Current setting in the second column, (for Film/Plate, M4-max).
15. Exit AVDIAG with a Soft Reset from the PC.

    The supply current offset is complete.

5.11 Take-up Cassette Clutch Adjustment Procedure

The following procedure details how to check and adjust the Avantra's take-up cassette clutch. Use this procedure when experiencing take-up cassette media feed problems and during all preventive maintenance calls.

To Adjust:

1. Loosen the six (6) screws that secure the top cover of the take-up cassette. Remove the cassette top cover.
2. Remove the two (2) screws securing the bearing retainers on each end of the cassette core. Remove the bearing retainers and lift out the cassette core.
3. While holding the cassette core in the orientation shown in Figure 5-3, use a force gauge (in/oz) to check the break away force of the clutch.
    a. Slowly pull the force gauge in the direction shown in Figure 5-3. The clutch should slip at approximately 1-1.5 lbs.
    b. If the clutch slips prior to 1-1.5 lbs, tighten the clutch adjustment screw clockwise. If the clutch slips after 1-1.5 lbs, loosen the clutch adjustment screw counter-clockwise. Recheck the clutch slip as in Step a. Readjust as necessary.

.

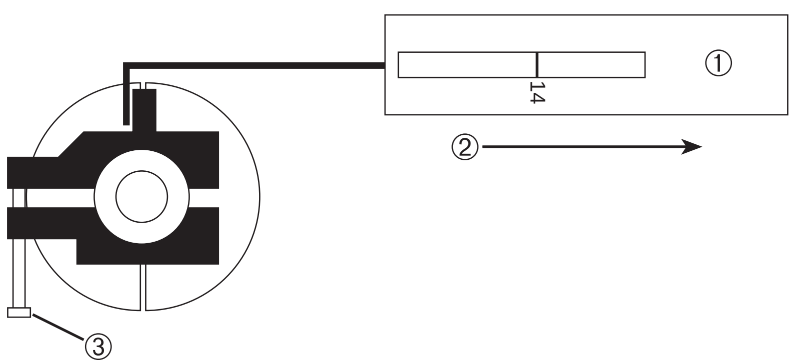


Figure 5-3 Using the force gauge.

①–Force gauge (in/oz). ②–Pull in this direction.
③–Clutch adjustment screw.

4. After completing the adjustment, reassemble the cassette core into the take-up cassette.

   Leave the top cover off at this time.

5. Enter the utility menu on the system control panel. Do a feed and watch the take-up cassette core.

   Make sure that the cassette finds its home position and that the media wraps around the core.

6. Install the take-up cassette top cover.

5.12 Feed Motor Calibration Test

The “Feed Motor Cal” test calibrates the speed of the supply drive servo motor to the speed of the Take-up Nip Drive Servo Motor. To perform this procedure you must unload the media and remove both supply cassettes.

This procedure should be performed whenever a supply or take-up servo motor or supply/take-up SDM board is replaced. Prior to performing this procedure you should balance the forward/reverse spindle direction of the supply motor by performing the Supply Motor Offset Alignment Procedure.

To perform the procedure:

1. Launch Avdiag from your PC.
2. In the Align Menu select “Feed Motor Cal”.
3. Follow the instructions in the dialog box.

   When the test is completed two values will be stored in the DEC. DSP/ Plate menu in DSP address location 4 and 5.

5.13 A/B Roller and Sensor Adjustment

Prior to adjusting the A/B spindle sensors you must check the supply roller disks at each end of the rollers. See Figure 5-4. The disks between spindle A and spindle B and the drive roller must be touching.

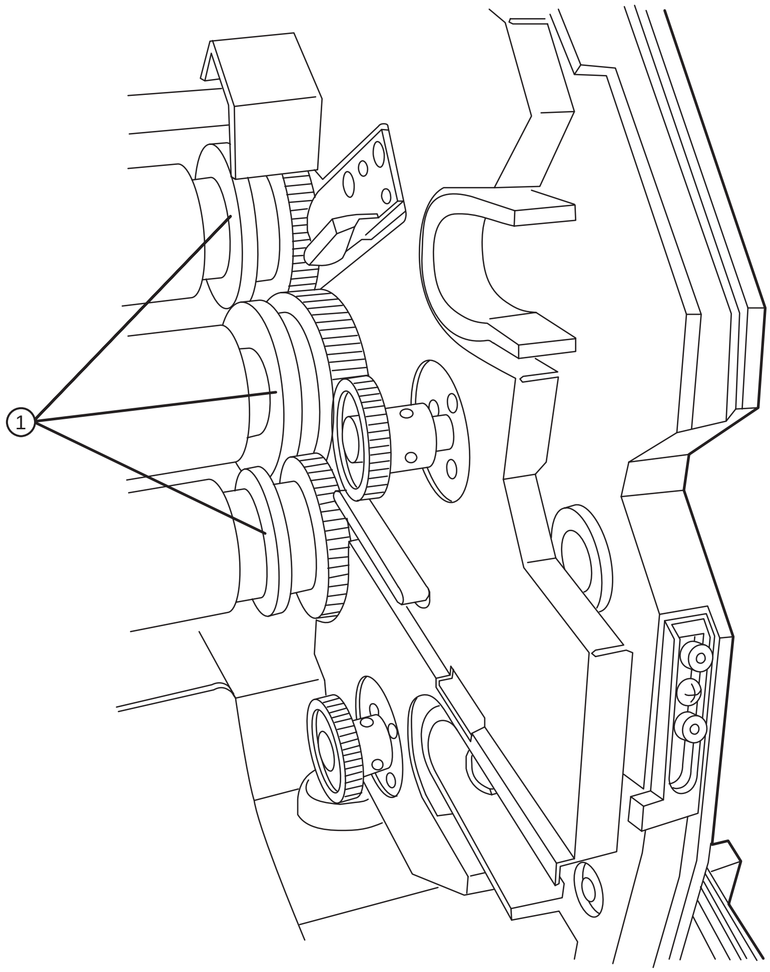


Figure 5-4 Supply spindle disks.

①–Supply spindle disks.

To check the supply spindle disks:

1. Open the spindle under test and place a 1 mil shim between the disks and then close the spindle.

   You should not be able to remove the 1 mil shim easily. If you can then the supply rollers need to be adjusted first before adjusting the sensors. Only the top and middle rollers can be adjusted.

2. If the left side disks need adjustment, remove one screw from the bow tie plastic piece holding the spindle select rod mechanism.

   Loosen the other screw and move the assembly up or down depending on which spindle disks A/B didn’t touch.

3. Replace and tighten the screws and perform the 1 mil test again. Even after this procedure is done it's possible that the disks may still fail the 1 mil test. In this case you need to adjust the left and right side disks of the same spindle so that they have equal (error) space.

4. To adjust the right side disks loosen the two screws securing the spindle select motor to it's motor housing bracket. Twist the motor back and forth to close the gap between the spindle disks on the right side of the rollers.

   If the spindle disks still don't touch then make the space between the left and right disks on the same roller equal. By doing this you can get the disks to touch by adjusting the sensors.

The A/B selector sensors should be adjusted so that when the mechanisms leaves one sensor the flag moves directly towards the other sensor. It should not move in the opposite direction first and then move towards the other sensor. If it does the sensors need adjustment.

To adjust the sensors:

1. First adjust spindle "A" sensor. To adjust loosen the two larger 5/16th screws below the flags. (See Figure 5-5).

   Move the assembly until the spindle "A" adjustment works correctly. When this adjustment is completed spindle "B" sensor may not be detected because you have move the flag assembly.

2. Adjust spindle "B" by loosening the two small 3/16th screws (see figure 5-5) and move the flag. Adjust the flag so the flag assembly moves directly to spindle "B" without moving to spindle "A" first. Moving the flag should not change the spindle A adjustment.

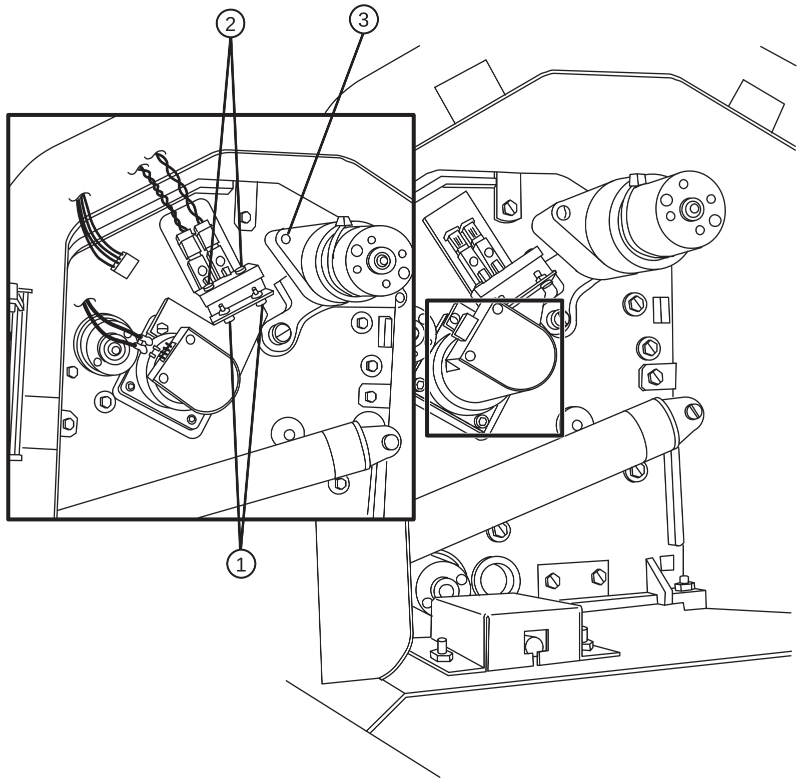


Figure 5-5 Sensor adjustment screws.

①–Two 5/16 inch screws. ②–Two 3/16 inch screws.
③–One of two spindle select motor screws.

Once this adjustment is completed test both spindle A and B disks using the 1 mil shim test to make sure that all six disks touch when that spindle is selected.

5.14 Slack Loop Test Procedure

NOTE: The slack loop test works only for thin media (4 mil and under). It is disabled for thick media (over 4 mil).

The slack loop test is used to determine the adjustment setting of the slack loop flag as well as the speed of the bridge and take-up motors, based on the number of times the slack loop is formed during a feed of a given length. The test is performed as follows:

1. The slack loop test function is located on the Secret Screen of the Avantra Control Panel. Press the proper key sequence on the "Configuration" Screen to enter this special screen. Refer to Figure 5-6.

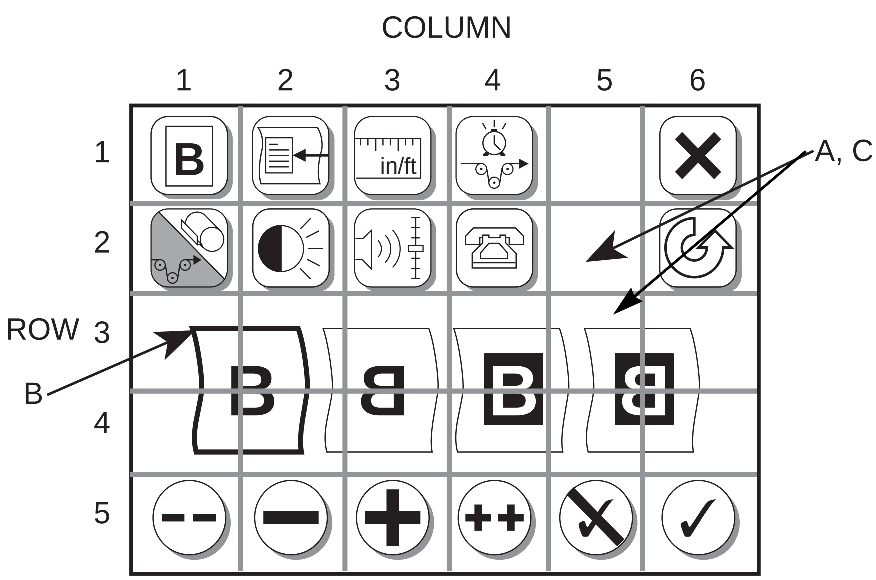


Figure 5-6 The Secret Screen.

A) Press button 5,2 first		A) Press button 5,3 first
B) Press button 1,3 twice	*or*	B) Press button 1,3 twice
C) Press button 5,2 again		C) Press button 5,3 again

NOTE: If there is an icon in location 5,2, use location 5,3.

2. Locate the key marked "Slack Loop Off" on the Secret Screen. Pressing this key will toggle the slack loop test function on and off. After enabling the slack loop test, exit the screen. Refer to Figure 5-7.

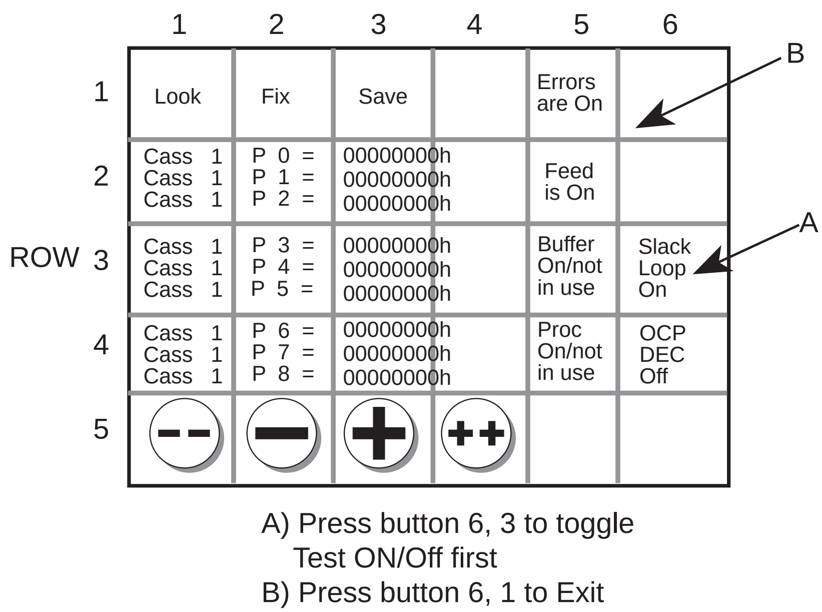


Figure 5-7 Exiting the Secret Screen.

3. On the “User Defaults” screen, set the user feed length to 44".
4. Go to the “Utility” screen and execute a “User Feed”. The number of loops appears in the lower right of the “User Feed” icon in the center of the screen. When the feed is complete the number gets updated. This number represents the number of slack loops completely formed (i.e. slack loop formed and unformed).
5. The number of slack loops formed for a 44" feed should be at least 11. Perform several “User Feeds” to determine an average number of loops formed. If the number is less than four, go to Step 6. If there are only four to ten slack loops, the bridge speed parameters should be adjusted. Perform the following steps:
   a. Using AVDIAG, download the “DEC Machine Parameters”. Select “Image/Focus/Bridge” and locate the Bridge parameters.
   b. Adjust the following parameters up or down accordingly, by steps of approximately 50.

      Ubr Fast Sp Thin - 4500 (nominal)
      Ubr Slow Sp Thin - 6500 (nominal)

NOTE: Raising the number decreases the speed. Lowering the number increases the speed.

---

c. After adjusting the parameters, reboot the system and check the slack loop number as in Step 4. If the slack loop number is still low, perform steps "a" thru "c" again until required number is reached.

6. If the number of loops formed is less than four and the bridge speed parameters are at nominal values, an adjustment to the slack loop flag is needed.

   a. Remove the lower bridge front cover and inspect the slack loop bracket/flag and sensor. check to see that the slack loop flag swings freely through the sensor with no binding.

   b. Adjust the slack loop bracket back and forth to create a larger or smaller slack loop. Refer to Figure 2.

   c. Reinstall the front cover loosely with one screw on each side. Reboot the system and check the slack loop number as in Step 4. If the slack loop number is still below four, perform steps "a" thru "c" again until the number reaches at least four.

NOTE: If the slack loop number never goes above "0", there may be a problem with the sensor. Use AVDIAG's "Sensors" test to verify that the sensor will go active and inactive.

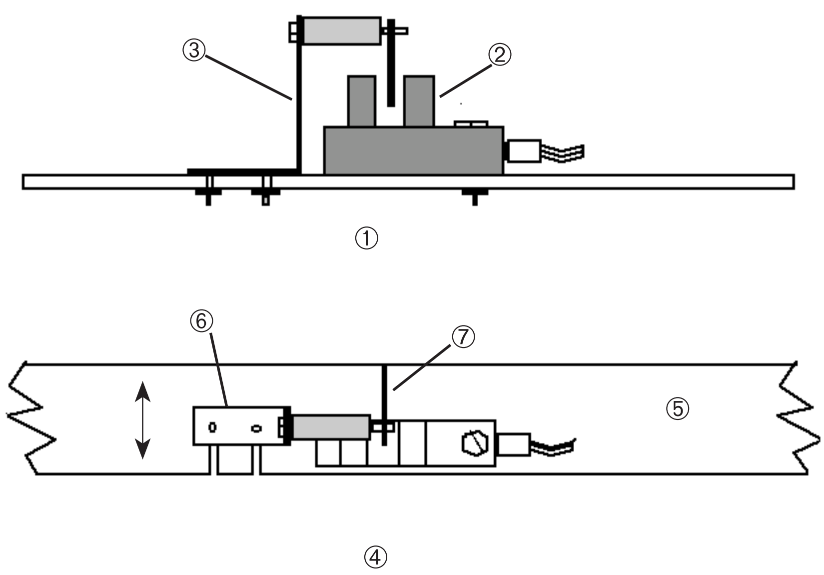


Figure 5-8 Slack Loop Test: Front view and top view.

①–Front view. ②–Slack loop sensor. ③–Slack loop bracket.
④–Top view. ⑤–Slack loop platen.
⑥–Adjust bracket back and forth to create larger or smaller loop.
⑦–Slack loop flag.

Chapter 6:
Preventive Maintenance

6.1 Introduction

Regular preventive maintenance (PM) extends the reliable and trouble-free operation of the Avantra. The following section details the inspection procedures necessary to keep the system running at top performance. The service engineer should perform the PM inspection every 3 months.

This section covers the following:

- General Preventive Maintenance Requirements
  - Mechanical Inspection
  - Operational Inspection
  - Cleaning

6.2 General Preventive Maintenance Requirements

Before starting the preventive maintenance inspection:

- Discuss the system's performance with the key operator(s).
- Determine if any malfunctions occurred since the last service call.
- Verify that all upgrades have been performed.

Preventive Maintenance should consist of the following procedures:

- Mechanical Inspection
- Operational Inspection
- Cleaning

6.2.1 Mechanical Inspection

This inspection insures that all mechanical subsystems within the Avantra are not damaged or loose, and are cleaned/lubricated and operating correctly.

6.2.1.1 General Inspection

Inspection consists of the following procedures:

1. Disconnect the AC power cord from the wall receptacle.
2. Remove the front cover. Remove the rear cover, if the system is not attached to a buffer.
3. Swing open the side doors on both ends of the system.
4. Inspect the system for the following conditions:
   - Damage to outer panels (note panel condition)
   - Damaged, missing, or loose hardware and connectors
   - Loose or damaged cables and line cords
   - Proper wire harness and cable routing
   - Damaged components
5. Do the following:
   - Carriage rail cleaning
   - Spin motor cleaning
   - Punch remnants removal

The following explains how to perform these three procedures.

6.2.1.2 Carriage Rail Cleaning Procedure

Periodic cleaning of the carriage rails keeps contamination out of the roller bearings and keeps rust from building up on the rails. Excessive build-up of contamination could result in copy artifacts.

Tools Required: Optic Pads (P/N 78047-002)

To Clean:

1. Swing open the side door on each end of the system.
2. Remove the drum light shields to gain access to both sides of the carriage assembly.
3. Line the drum with a piece of cut media to catch any contamination that may fall during the cleaning procedure.
4. Gently slide the carriage assembly away until it reaches the other end.
5. Using an optical wipe, clean the rails. Remove all the contamination. As much as possible, clean contamination from other exposed surfaces.
6. Move to the other end of the system and perform the previous step on the rails.

6.2.1.3 Spin Motor Mirror Cleaning Procedure

The following procedure insures that the spin motor mirror is clean. This prevents a reduction in the amout of laser light that exposes the media on the drum surface. Perform this procedure at each preventative maintenance call.

Tools Required: Optic Pads (P/N 78047-002), allen wrench

1. With the system's power off, open the left side and remove the drum light shield.
2. Gently slide the carriage toward you to allow optimum access to the spin motor.
3. Remove the left shroud assembly by disconnecting the brush solenoid cable and loosening the four thumb screws.
4. Using an optic pad, wipe the mirror with a single stroke. Wipe the surface again in the same manner with a clean section of the optic pad.

NOTE: Do not scrub/stroke the mirrored surface back and forth or reuse a contaminated section of an optic pad.

5. Inspect the mirror. Insure that all contamination and streaking has been removed from mirrored surface.
6. Repeat Step 4 as necessary until clean.
7. Re-install the left shroud assembly.

6.2.1.4 Punch Remnants

The Avantra 36/44 has two sets of punches. One on the take-up side (5-hole), and the other on the supply side (1 hole). Each punch has its own remnant container to catch the punched out media. Empty the containers at each PM call .

Tools Required: None

To Empty the Take-up Side:

1. Open the top cover.
2. Remove the front top and middle covers.
3. Remove the take-up light shield by loosing the three thumb screws.
4. Lift the punch remnant container from the system. Empty the container.
5. Replace the punch container, panel and covers.

To Empty the Supply Side:

1. Open the top cover.
2. Move the bridge to light mode. Lift the bridge to the up position.
3. Open the left side cover and remove the rear access panel by pushing up on the three white buttons. Remove the access panel.

4. Open the right side cover and remove the rear access panel by pushing up on the three white buttons. Remove the access panel.
5. Remove the two screws securing the back supply light shield located behind the supply compartment. Pull the light shield up between the supply compartment and the bridge.
6. Lift the panel covering the supply punch and the punch container.
7. Vacuum out punch chaffs from the punch container pan from the right.
8. Re-install the panel and covers.

6.2.1.5 General Inspection/Cleaning for Customer

The general inspection/cleaning should be performed by the customer.

To Inspect/Clean:

1. Vacuum the supply cassettes before installing a new roll of media.
2. Vacuum the black intake fan filter (P/N 66602-001) every month.
3. Replace the exhaust fan filter (P/N C00305-001 Orange/White/Black) every three months.
4. Clean the punch remnants containers every three months.

6.2.2 Operational Inspection

This inspection insures the quality and proper alignment of the system.

To Inspect:

1. Turn the system on and monitor the boot-up sequence.
2. Insure that the system successfully completes BCC's and loads the application firmware with no errors.
3. Using the Avantra Diagnostic (AVDIAG) program on the PC, run all selectable tests. Insure that all tests run successfully.
4. Check the error log, noting any errors. Discuss the results with the operator. Before exiting, clear the error log.
5. Using the PC Imager program, run an exposure array @ 2400dpi.
6. Check the density and enter the appropriate value (if different) in the Parameters submenu.
7. Run the following test files:
   - 50% @ 2400
   - 100/85% @ 2400
   - Scale/Fid @ 2400
   - 1x1 Hor. Line @ 2400

   Examine the output copy and resolve any problems.

8. Run the focus alignment procedure. Refer to Chapter 5, Alignment Procedures.
9. Run the pulse width modulation procedure (PWM). Refer to Chapter 5, Alignment Procedures.
10. Run the supply motor offset alignment procedure. Refer to Chapter 5, Alignment Procedures.
11. Save to system Diskette - DEC Machine Parameters, DEC Correction Tables, and OCP User Parameters. Refer to Chapter 3, Diagnostics.
12. Check the top cover shocks for proper operation. Replace if necessary.
13. Check the vacuum system for proper operation. .

6.2.2.1 Bridge Maintenance

The following procedures should be performed on systems with bridges.

Check List:

1. Check the bridge shocks for proper operation. Replace if necessary.
2. Check the condition of the drive belt. Replace if necessary (P/N 56461-084).

6.2.3 Cleaning

The general cleaning procedures described in the following section help avoid contamination of the system due to dust, media chaff, and other particles that physically interfere with imaging operations.

Use the following guidelines when performing the cleaning procedure:

- To clean, use a tack cloth (part number TBD).
  - The motion with the tack cloth should be a light blotting in confined areas. For large areas, a light wiping motion can be used.
  - Care must be taken not to use too much pressure, because this could leave a sticky residue on the surface.
  - NEVER use the tack cloth on a rubber roller.
- *Soft vacuum* refers to the usage of a soft bristle nozzle. Any residue could affect the performance of the system.
  - Do not attempt to clean unmachined casting surfaces. These surfaces should only be vacuumed.
- *Hard vacuum* refers to the use of a vacuum with any attachment other than a brush.

6.2.3.1 Exterior

To Clean:

1. Soft vacuum all exterior seams and surfaces, working from top to bottom.

2. Remove the black, input fan filter.
3. Hard vacuum the black filter.
4. Soft vacuum fan area.
5. Replace the black, input filter with a new one, if necessary.
6. Check the condition of the drum filter (Orange/White/Black) located on the right drum light shield. This filter cannot be vacuumed.
7. Replace the drum filter with a new one, if necessary.

6.2.3.2 Supply/Take-up Cassette Area

To Clean:

1. Open the top cover and lift up the bridge, if installed.
2. Pull up and remove both supply cassette light shield covers.
3. Unload the media and remove the supply and take-up cassettes.
4. Using clear packing tape, clean the supply rollers (rotate the rollers until their entire surface has been cleaned).

CAUTION: When cleaning the supply rollers, do NOT substitute any other tape (i.e. , masking, duct tape, etc.) for clear tape. Substitutes may leave a sticky residue on the roller, and any residue could cause PERMANENT DAMAGE to the rollers.

---

5. Soft vacuum the following areas:
   - Supply trays
   - Under the supply drive rollers
   - Take-up platform
   - All accessible areas
   - Take-up labyrinth opening

6.2.3.3 Take-up Module Area

To Clean:

1. Remove the three bottom front covera.
2. Remove the take-up cover light shield.
3. Remove the outer take-up nip assembly.
4. Soft vacuum:
   - All assembly surfaces including punch and cutter assemblies
   - Area below drum
   - Nip drive rollers, using clear tape

NOTE: When cleaning the nip drive rollers, do NOT substitute any other tape (i.e. , masking, duct tape, etc.) for clear tape. Substitutes may leave a sticky residue on the roller, and any residue could cause PERMANENT DAMAGE to the rollers.

5. Install the outer take-up nip assembly.
6. Install the take-up light shield cover.
7. Install the bottom front covers.

6.2.3.4 Lower Interior Area

To Clean:

1. Open the two (2) side panels.
2. Soft vacuum.
3. Clean the:
   - Side panel interior surfaces and edges
   - Exterior light shields
   - Frame

6.2.3.5 Inner System

To Clean:

1. Remove the right and left light shields.
2. Move the carriage to the center of the drum.
3. Soft vacuum the:
   - Inside of the light shields
   - Accessible base and engine casting areas
4. Soft vacuum and clean the:
   - Drum surface
5. Install the left and right drum light shields.
6. Close the left and right covers.
7. Install the supply cassette light shields.
8. Install the supply and take-up cassettes.
9. Close the supply cassette light shield.
10. Close the top cover.

6.2.3.6 Bridge Cleaning

If the optional bridge is installed, it should be cleaned during every preventive maintenance.

To Clean:

1. Open the top cover and remove the three bridge covers by lifting the two latches on each side.
2. Soft vacuum the:
   - Three top covers (both sides)
   - Bridge rollers
   - Platen between the bridge rollers
3. Lift the bridge to the up position and vacuum the labyrinth opening.
4. Lower the bridge and install the three top covers.

6.2.3.7 Buffer

If the Buffer is installed, it should be checked and cleaned during every preventive maintenance.

To Clean:

1. Remove the top cover.
2. Remove both the left and right side covers.
3. Move the buffer carriage to the processor side and clean both rollers using clear masking tape.
4. Move the buffer carriage assembly to the bridge side and make sure that the carriage butts up evenly on both ends.

   If one end hits the stop before the other, then the carriage rails may need to be re-aligned. Refer to Chapter 2 in Section III, Buffer.
5. Remove media at the bottom of the buffer.
6. Re-install side panels and covers.

Appendix A:
Specifications

A.1 Introduction

This section details pertinent technical equipment specifications for the Avantra 36/44 imagesetter.

A.2 Avantra 36/44 Imagesetter Specifications

This section includes the following imagesetter specifications:

- Physical
- Electrical
- Environmental
- Functional

Physical Specifications

Width:	73" (185.42 cm)
Height:	48" (121.92 cm)
Depth:	35" (88.90 cm)
Weight:	1700 lbs. (771.11 kg)

Electrical Specifications

Volts:	115/230
Amp:	5 / 2.5
Rec:	NEMA 5-20R
Power:	575 Watts
Heat Output:	1962 BTU's

Environmental Specifications

Oper/Temp:	60° to 80° F (15° to 27° C)
Absolute Accuracy:	70° +/- 3°
Humidity:	45 to 55%, non-condensing

Functional Specifications

Format Size:	36" x 44.5" (91.44 cm x 113.03 cm)
Maximum Image Area:	35.7" x 44.5" (90.68 cm x 91.44 cm)
Resolution/Spot Size:	1200/20
	1800/15
	2400/9.5
	3600/8.0
Repeatability:	+/- 0.5 mils
Punches	+/- 1 mil
Accuracy (Duplo):	+/- 1.25 mils (Avantra 36S/44S) +/- 1.75 mils (Avantra 36/44)
Density Range:	4.2D to 4.6D
Density Variation:	.2D deviation
Dot Gain:	2% deviation
Line Screens:	Up to 300 LPI
Media Types:	*Red sensitive, HeNe Paper, Film, Plate*
	Paper: 250 ft roll (36", 26", 24" paper sizes only)
	Film: 250 ft roll (4 mil) Film: 148 ft roll (7 mil)
	Plate: 100 ft roll (5, 8 and 12 mil)
Media Thickness:	4 to 12 mil (operator selectable)
Media Widths:	User definable from 16" to 36" film or plate

Appendix B
Spare Parts

Imagesetter

The following lists spare parts for the 36/44 and 36S/44S imagesetters.

Cables

206116-504	Control panel/OLP adapter cable (RJ45–RJ45)	AV36/44/36S/44S
207692-501	OLP adapter connector (RJ45–DB9)	AV36/44/36S/44S
C04688-501	Avantra OLP interface cable (DB9–DB9)	AV36/44/36S/44S
066714-304	Carriage flex cable	AV36/44/36S/44S
201179-507	Supply SDM ribbon cable	AV36/44/36S/44S
201179-508	T/U SDM rubbon cable	AV36/44/36S/44S

Carriage

002637-558	Carriage assembly	AV36/44
002893-558	Carriage assembly	AV36S/44S
208867-501	Motor encoder (A)	AV36/44/36S/44S
208866-501	Carriage digital encoder (P)	AV36/44/36S/44S
066719-001	Carriage home sensor	AV36/44/36S/44S

Electronics

P00008-502	Carriage drive module	AV36S/44S
209710-502	Carriage drive module	AV36/44
207914-501/502	*Digital engine controller (DEC)	36S/44S
209746-502	Digital engine controller (DEC)	AV36/44
002525-570	Operator control panel	AV36/44/36S/44S

209287-503	Sensor Driver Module (SDM)	AV36S/44S
209287-502/503	*Sensor Driver Module (SDM)	AV36/44
209323-501	Vacuum module	AV36/44/36S/44S
002525-555	Power supply	AV36/44/36S/44S
064404-001	Power cord	AV36/44/36S/44S
064466-001	Power cord (international)	AV36/44/36S/44S

* Depends on the software loaded in the system. Refer to OMNI document (50.552)

Frames/Covers

207620-501	Exhaust fan	AV36/44/36S/44S
066758-001	Intake fan	AV36/44/36S/44S
06602-001	Intake fan filter (DEC)	AV36/44/36S/44S
C00305-001	Intake fan filter (Rear, O/W/B)	AV36/44/36S/44S
067405-001	Front cover gas shock	AV36/44/36S/44S
066780-009	Top cover gas shock	AV36/44/36S/44S
066766-002	Levelling feet	AV36/44/36S/44S
057102-001	Door interlock switch	AV36/44/36S/44S

Media Transport

066486-004	Supply cassette rewind motor	AV36/44/36S/44S
066023-002	Supply drive servo motor	AV36/44/36S/44S
207548-509	Supply positioning motor	AV36/44/36S/44S
066486-002	Take-up cassette motor	AV36/44/36S/44S
C00035-002	Take-up cassette motor wheel	AV36/44/36S/44S
066481-003	Take-up nip drive servo motor	AV36/44/36S/44S
002869-501	Supply drive roller assembly	AV36/44/36S/44S
002637-519	Supply jam sensor assembly	AV36/44/36S/44S
066721-002	Supply media present sensor	AV36/44/36S/44S
066719-001	Supply position sensor	AV36/44/36S/44S
066425-001	Take-up cassette present sensor	AV36/44/36S/44S
066393-001	Take-up core position sensor	AV36/44/36S/44S
066721-002	Take-up media present sensor	AV36/44/36S/44S

066390-121	Take-up media jam sensor	AV36/44/36S/44S
002637-563	Take-up cutter assembly	AV36/44/36S/44S
002637-562	Take-up drive assembly	AV36/44/36S/44S
067334-003	Cutter home switch	AV36/44/36S/44S
209973-501	Brush solenoid (3 per)	AV36/44/36S/44S
066486-002	Flapper motor	AV36/44/36S/44S
002637-524	Flapper assembly (L & R)	AV36/44/36S/44S

Opto-Mechanical

067253-008	Polarizer home sensor	AV36/44/36S/44S
066390-108	Spot changer home sensor	AV36/44/36S/44S
066390-108	Focus home sensor	AV36/44/36S/44S
066390-108	Beam compressor home sensor	AV36/44/36S/44S
002943-501	Spin motor (SpeedRing)	AV36/44
002943-502	Spin motor (WestWind)	AV36/44
002944-501	Spin motor (SpeedRing)	AV36S/44S
002637-556	Spot Generation Module (SGM)	AV36/44/36S/44S

Punch Assemblies

207548-508	Take-up punch motor	AV36/44/36S/44S
207548-504	Supply punch motor	AV36/44/36S/44S
066390-107	Supply/Take-up punch sensor	AV36/44/36S/44S
002637-586	Supply punch, bacher/stoesser	AV36/44/36S/44S
002638-580	Supply punch, bacher plate	AV36/44/36S/44S
002637-585	Take-up punch, stoesser	AV36/44/36S/44S
002638-581	Take-up punch, bacher (film)	AV36/44/36S/44S
002638-582	Take-up punch, bacher (plate)	AV36/44/36S/44S

Supply Cassette

002637-537	Supply cassette assembly	AV36/44/36S/44S
002935-501	Left spindle assembly (gear)	AV36/44/36S/44S
002935-502	Right spindle assembly (thumb wheel)	AV36/44/36S/44S
002935-503	Spindle assembly (both)	AV36/44/36S/44S

Take-up Cassette

002637-522	Take-up cassette assembly	AV36/44/36S/44S

Vacuum System

067328-001	Volt sensing relay	AV36/44/36S/44S
065979-001	Solid state relay	AV36/44/36S/44S
067339-001	Vacuum pump transformer	AV36/44/36S/44S
209952-501	Vacuum pump assembly	AV36/44/36S/44S
209968-501	Vacuum value assembly	AV36/44/36S/44S

Humidifier

067505-001	Water wick	AV36/44/36S/44S
067506-001	Water bag	AV36/44/36S/44S
P00058-501	Humidifier PC board	AV36/44/36S/44S
002858-501	Humidifier box assembly	AV36/44/36S/44S
C04485-001	Air filter	AV36/44/36S/44S
067441-101	Water float switch	AV36/44/36S/44S
065162-101	Fan	AV36/44/36S/44S
067504-101	Water supply solenoid	AV36/44/36S/44S

Index

Section II:
Bridge

Chapter 1:
Bridge Installation

1.1 Introduction

This chapter describes the steps necessary for installing the internal bridge and for insuring that it functions properly.

The following takes you through the necessary procedures:

- Removing the Imagesetter Top Cover
- Attaching the Capture Bar to the Bridge
- Raising and Lowering the Bridge into the Imagesetter
- Attaching the Bridge to the Imagesetter
    - Attaching the Bridge Foot
    - Attaching the Gas Shocks
    - Adjusting the Detent Plate
    - Aligning the Solid Stops
    - Setting up the DEC to Bridge/Buffer Interface
    - Attaching the Ground Wires

1.2 Removing the Imagesetter Top Cover

Before the bridge can be installed into the imagesetter, the top cover must be removed.

Steps

Tools required: Screwdriver

1. At the rear of the imagesetter, remove the allen screws attaching the top back panel. Refer to Figure 1-1.
2. Raise the top cover.

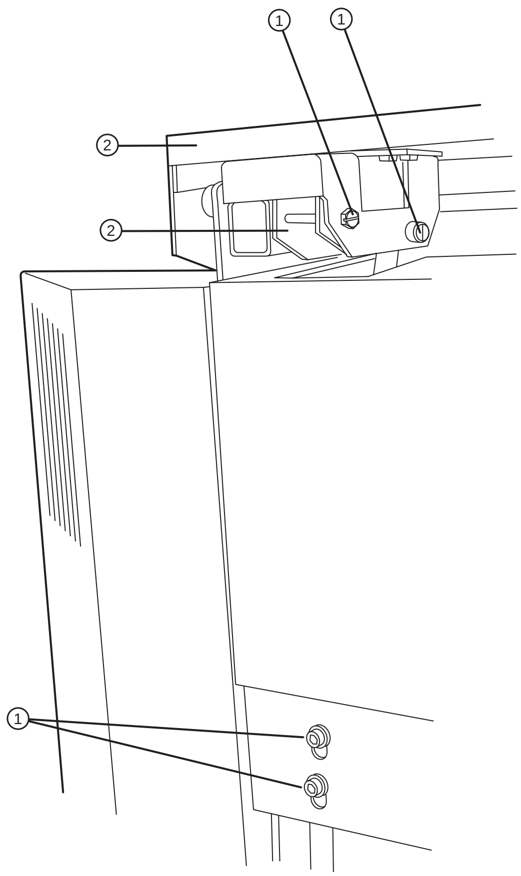


Figure 1-1 Rear of the imagesetter.

①–Top cover. ②–Hinge stop. ③–Hinge stop bolt. ④–Gas shock retaining bolt. ⑤–Top back panel allen screws.

3. Standing in front of the imagesetter, remove the three (3) shoulder screws (top, bottom and side) on the cover hinge. Refer to Figure 1-2.

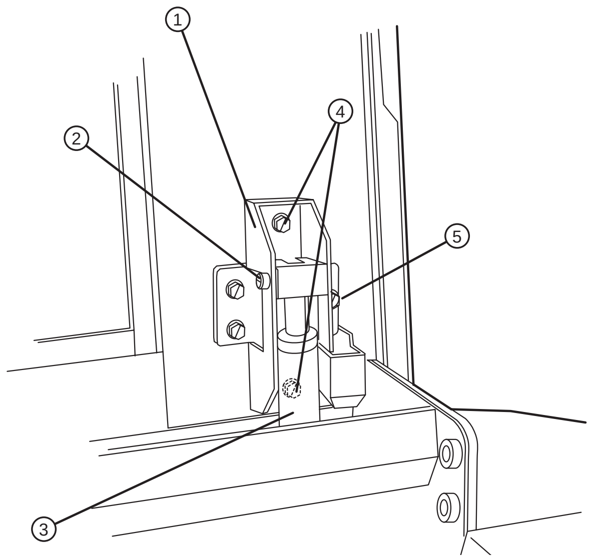


Figure 1-2 The gas shock shoulder screws.

①–Hinge. ②–Gas shock retaining bolt. ③–Gas shock.
④–Top and bottom shoulder screws (remove). ⑤–Side shoulder screw (remove).

4. Drop the top cover down.
5. Standing at the rear of the imagesetter, loosen the two (2) hex head screws from the hinge assemblies, left and right. Refer to Figure 1-3.
6. Slide the bracket out. Refer to Figure 1-3.

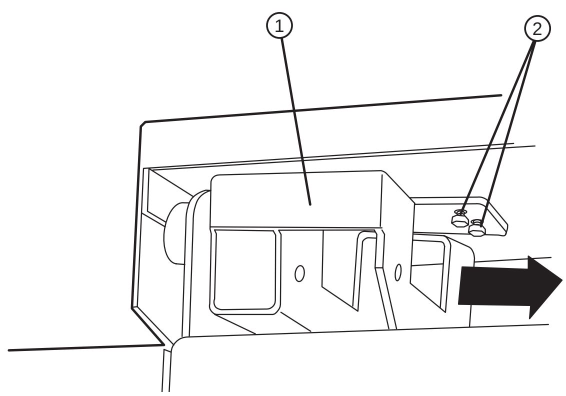


Figure 1-3 The top cover hinge assembly.

①–Top cover hinge assembly. ②–Two hex screws (loosen).

7. Pull the bottom segment up on the top cover. Refer to Figure 1-3.

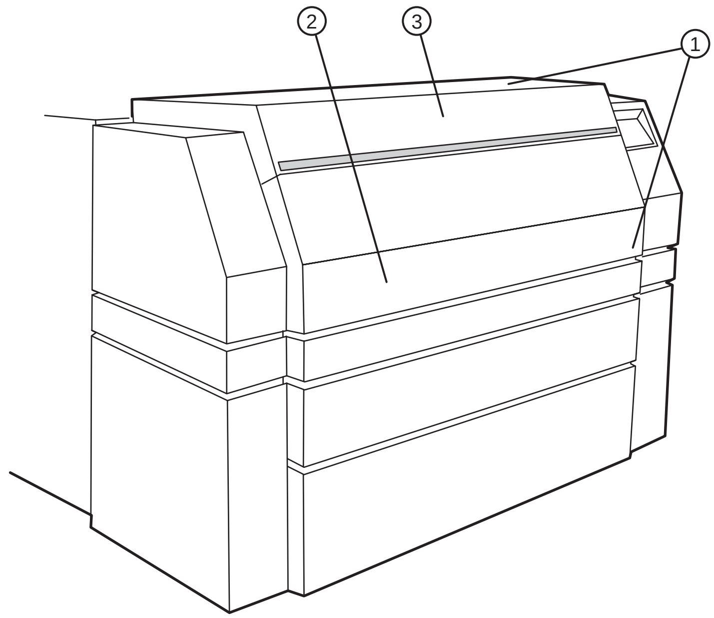


Figure 1-4 Top cover bottom segment.

①–Front panel. ②–Bottom segment. ③–Top segment.

CAUTION: Use at least two people when performing the next step; i.e., lifting the top cover.

---

8. With a strong person (or persons) on each end, lift the top cover straight up from the imagesetter.

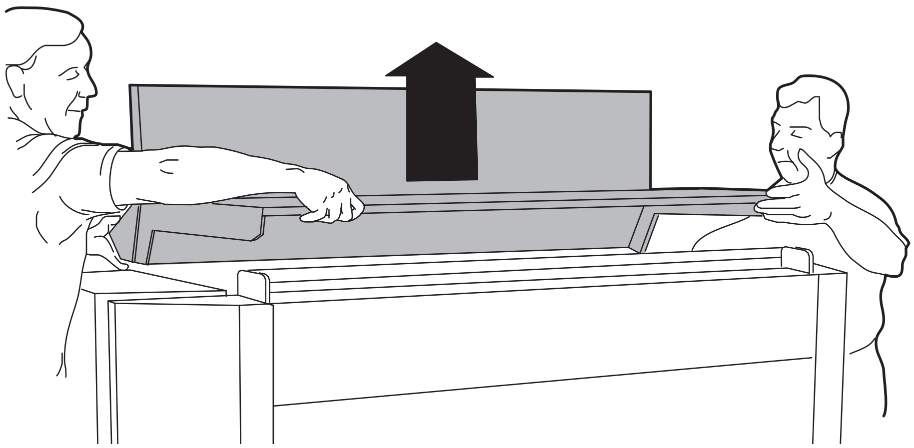


Figure 1-5 Lifting the cover from the imagesetter.

1.3 Attaching the Capture Bar to the Bridge

This section tells you how to safely secure the crane's capture bar to the bridge.

Tools required: 1/4" allen wrench

In addition to the tools, you will need the bridge accessories kit, which came with the imagesetter. Open the accessories box and check its contents.

Steps

1. Place the bridge, top up, on a raised surface near the on-line processor crane.

> **NOTE: Do not attach the crane's cable hook onto the capture bar eyelet until the capture bar is secured to the bridge.**

2. Remove the light shields in the top part of the bridge.
3. Remove the two (2) screws, left and right, located in the top portion of the bridge. Refer to Figure 1-6.

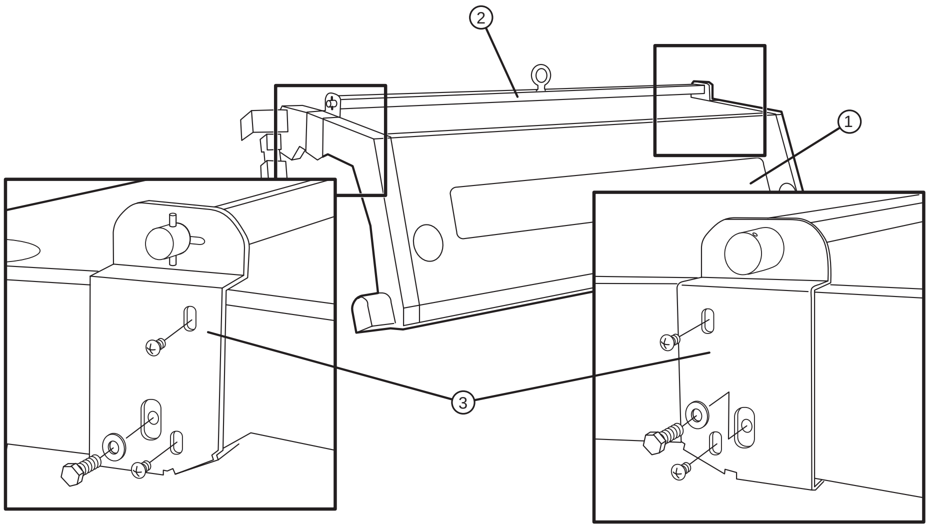


Figure 1-6 Attaching the capture bar and brackets to the bridge.

①–Bridge. ②–Capture bar. ③–Two capture bar brackets.

4. Using the bridge screws, attach the left bracket to the bridge. Refer to Figure 1-6.

   The left bracket is for the roll pin side of the capture bar.

5. Using one of the two (2) 9/16" bolts and washers provided, secure the bracket to the side of the bridge. Refer to Figure 1-6.
6. Insert the roll pin side of the bar into the bracket.
7. Insert the cap side of the bar into the right bracket.
8. Using the bridge screws, attach the right bracket to the bridge. Refer to Figure 1-6.
9. Using the remaining 9/16" bolt and washer provided, secure the right bracket to the side of the bridge. Refer to Figure 1-6.
10. Screw the gear collar clamp onto the capture bar to hold it in place against the bracket.

1.4 Raising and Lowering the Bridge into the Imagesetter

Tools required: 9/16" hex wrench

Steps

1. Swing the crane boom around so that the cable clip is over the capture bar eyelet. Lower the cable clip to the eyelet.
2. Clip the cable to the eyelet and raise the bridge slowly.
3. When the bridge height exceeds the height of the imagesetter, swing the boom around. Suspend the bridge over the imagesetter.
4. Before lowering the bridge, grease the V-groove and flat surface on the detent plates (left and right) located within the imagesetter. Refer to Figure 1-7.

   Use the grease and applicator provided.

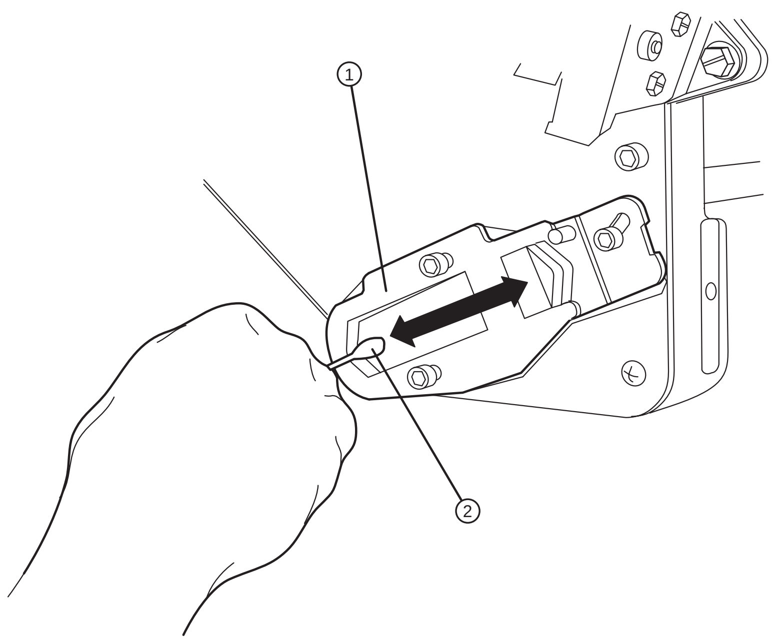


Figure 1-7 Lubricating the detent plate V-groove.

①–Detent plate/V-groove. ②–Lubricant.

5. With the rear of the bridge tilted downward and the bridge aligned over the mounting bracket holes in the imagesetter, slowly lower the bridge into place. Refer to Figure 1-8.
6. Hand tighten the three (3) allen cap screws, in the bearing blocks, left and right (see Figure 1-11).
7. Unclip the cable from the capture bar eyelet. Push the boom and cable out of the way.
8. Remove the 9/16" bolt and washer from the capture bar bracket, left and right (see Figure 1-6).

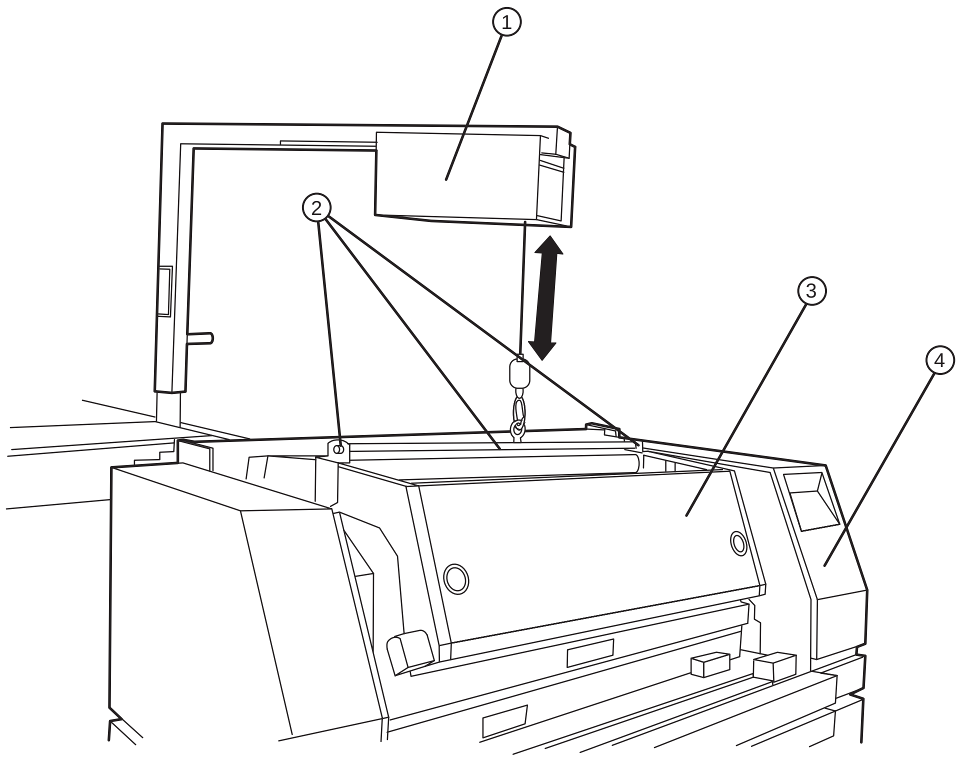


Figure 1-8 Lowering the bridge into the imagesetter.

①–Crane. ②–Capture bar brackets. ③–Bridge. ④–Imagesetter.

9. Remove the two (2) screws from the capture bar bracket, left and right (see Figure 1-6). Remove the side brackets and return the screws to the sides of the bridge.
10. Replace the light shields at the top of the bridge.

1.5 Attaching the Bridge to the Imagesetter

This section explains how to attach the bridge to the imagesetter including the following procedures:

- Attaching the bridge foot
- Attaching the gas shocks
- Adjusting the detent plate
- Attaching and aligning the solid stops
- Setting up the DEC to bridge/buffer interface
- Attaching the anti-static wires

1.5.1 Attaching the Bridge Foot

Tools required: None

Steps

1. Position the bridge foot on the take-up platform of the imagesetter. Lower the bridge and align the bridge body with the foot.
2. Using the foot thumb screws (left and right), attach the foot to the bridge. Refer to Figure 1-9.

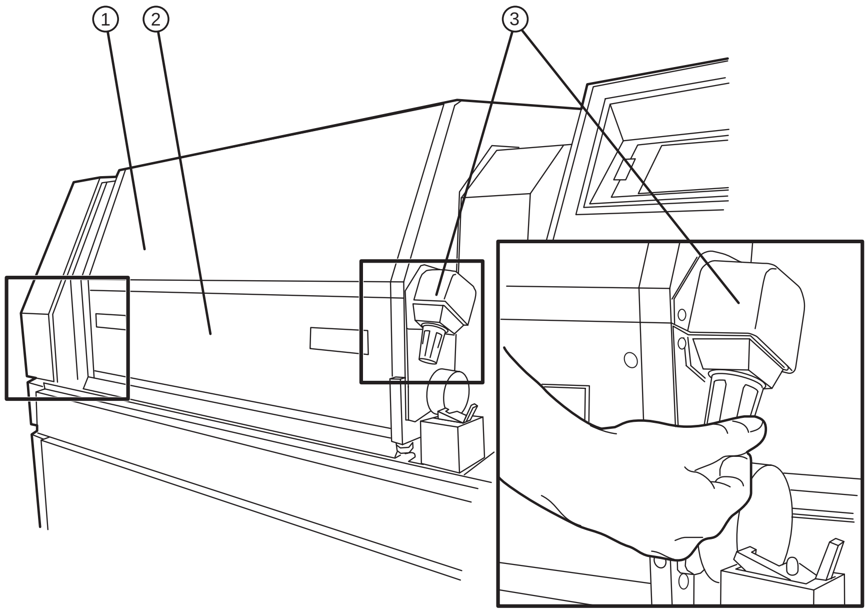


Figure 1-9 Attaching the foot to the bridge using the foot thumb screws.

①–Bridge. ②–Bridge foot. ③–Foot thumb screw (one of two).

3. Using a flashlight, look to the left and right of the bridge to make sure that the guide blocks are not hitting the take-up platform opening. Refer to Figure 1-10.

   If a guide block is hitting, move the bridge left or right to compensate.

4. Check to make certain that the bridge foot lies flat on the take-up platform.

   With the bridge up, hold a plastic shim on the take-up platform at the left rear. Lower the bridge onto the shim and try to pull the shim from beneath the foot. There should be some resistance. If the shim comes out easily, the foot is not flat against the platform.

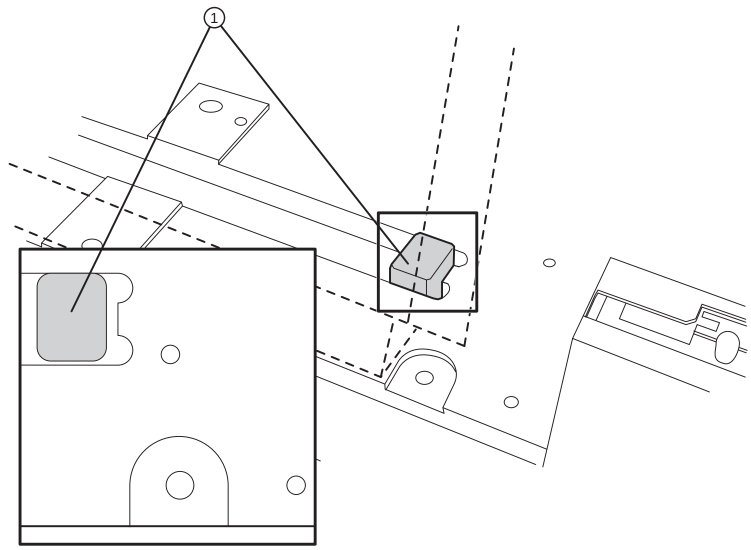


Figure 1-10 Aligning the bridge using the guide blocks.

①–Guide block (one of two).

5. Also make certain that the bridge bearing blocks (top left and right) are straight. If they are, secure to the lower casting by tightening the three (3) allen screws. Refer to Figure 1-11.

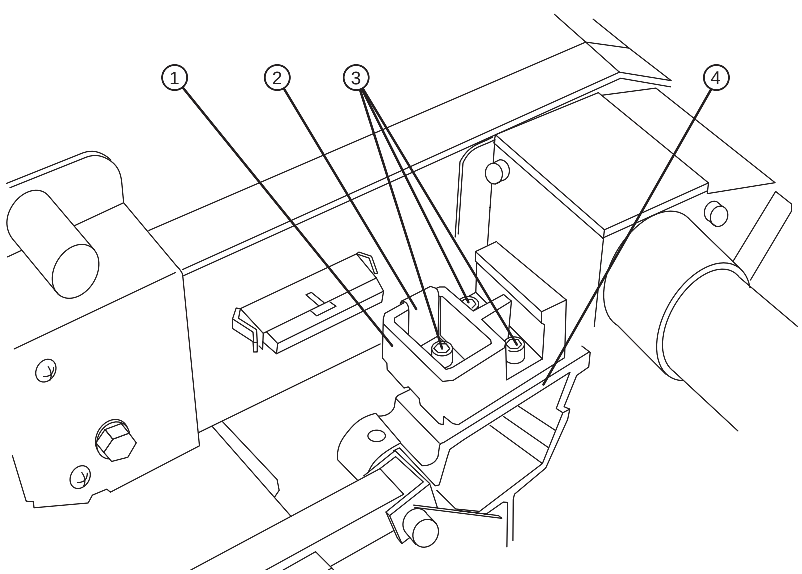


Figure 1-11 Securing the bearing blocks.

①–Bearing block. ②–Sensor reflector. ③–Three allen screws.④–Lower casting.

1.5.2 Attaching the Gas Shocks

Tools required: Screwdriver

Steps:

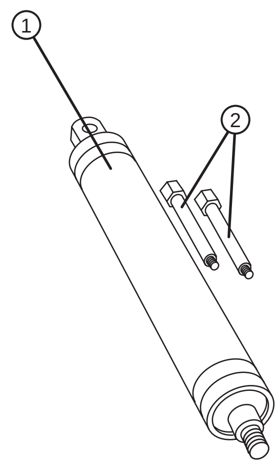


Figure 1-12 Gas shock and bolts.

①–Gas shock (one of two). ②–Spring bolts (two of four)

1. Screw the threaded end of the gas shock into the bridge mount casting at the top rear of the bridge. Refer to Figure 1-13.

   If necessary, lift the bridge to align the ear with the hole in the bridge mount casting.

2. Using the spring bolt (see Figure 1-12) and nut provided, attach the ear to the lower mount casting. Refer to Figure 1-13.

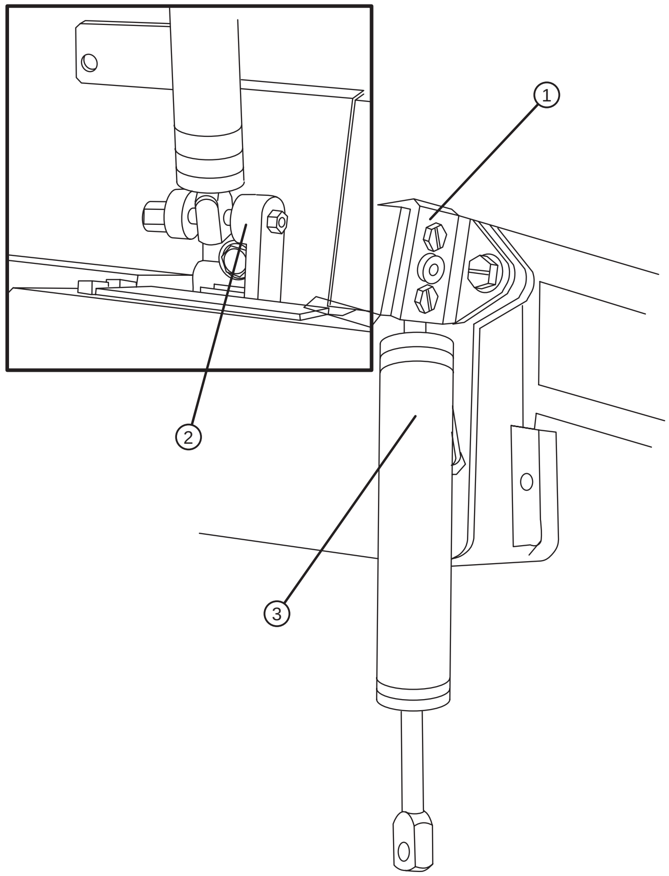


Figure 1-13 Attaching the gas shock.

①–Bridge mount casting. ②–Lower mount casting. ③–Gas shock.

3. Lower the bridge slowly to make sure that the shocks work.
4. Lift the bridge and check the guide block for scuffing (see Figure 1-10). Lower the bridge and, with a flashlight, check again that the guides are not hitting the plate.

5. Pop in the button plugs at the top of the bridge, left and right side. Refer to Figure 1-14.

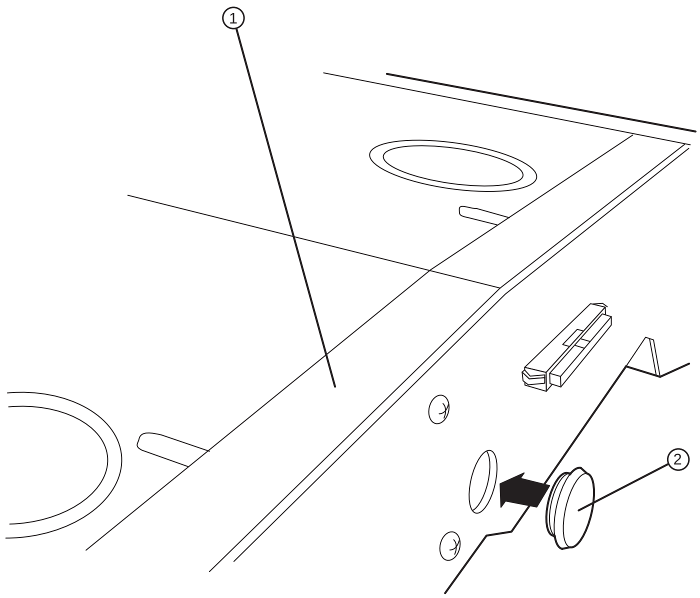


Figure 1-14 Placing the button plugs.

①–Bridge. ②–Button plug (one of two).

1.5.3 Adjusting the Detent Plate

Tools required: Screwdriver

Steps

1. Open both side doors on the imagesetter by loosening the thumb screws on the inside. Refer to Figure 1-15.
2. Remove the two (2) plastic access panels at the top of the imagesetter.

   This gives easier access to the detent plates.
3. The bridge must be in the down position for this procedure.

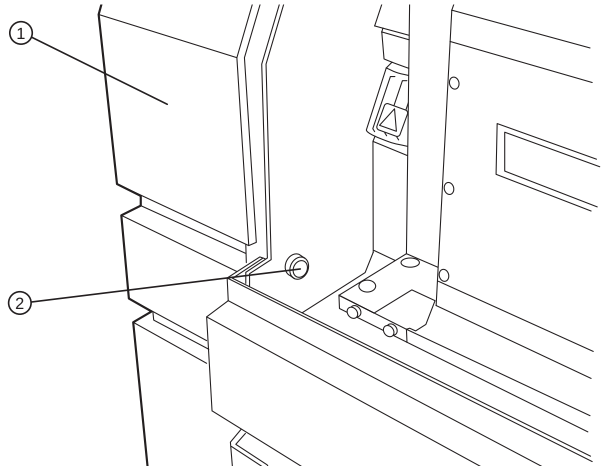


Figure 1-15 Opening the imagesetter side doors.
①–Side door. ②–Thumb screw.

4. Install the spring plungers loosely, left and right. Refer to Figure 1-16. Thread the plungers with the ball facing in.

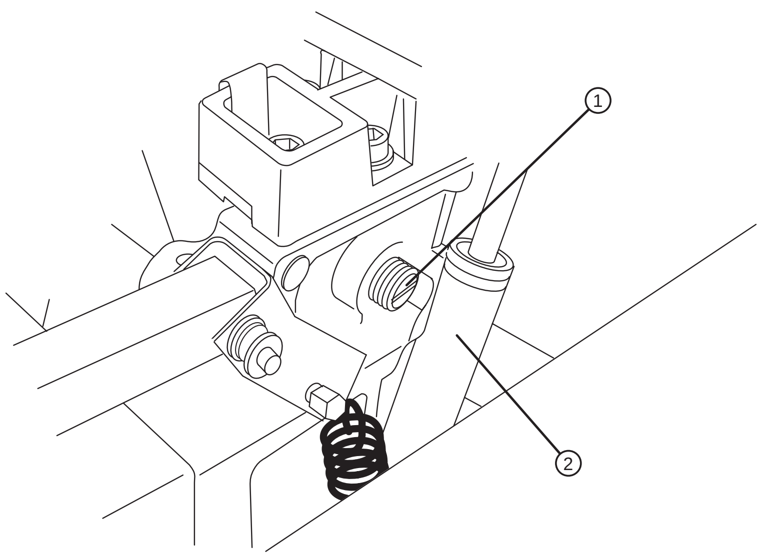


Figure 1-16 Installing the spring plunger.
①–Spring plunger. ②–Gas shock.

5. Make certain that the detent plate adjustment allen screws are loose on the detent plate. Refer to Figure 1-17.
6. Screw the spring plungers in until the spring loaded ball centers within the front V-groove of the detent plate. Refer to Figure 1-17. Make certain that the detent just touches the ball.

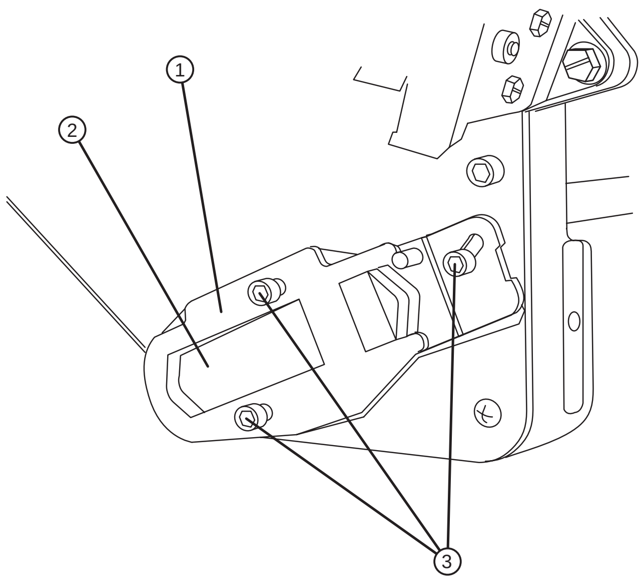


Figure 1-17 Adjusting the detent plate.

①–Detent plate. ②–V-groove. ③–Adjustment allen screws.

7. Back the screw out 1/2 turn.
8. Slide the detent plate forward and hold it in place.

   This step preloads the spring plungers, which exerts a downward force when the bridge is in the down position.
9. Tighten the detent plate adjustment allen screws.
10. Lift the bridge halfway so that the plunger ball centers in the detent plate.
11. Screw in the spring plunger one full turn.
12. Raise the bridge all the way to make certain that the plunger springs into the back groove.
13. Lower the bridge to check that the plunger springs into the front groove.

1.5.4 Aligning the Solid Stops

Tools required: Loctite, 9/16" wrench

Steps

NOTE: If the take-up platform in your system does not have the solid stop pad areas (see Figure 1-18), then you must install a newer platform.

1. Put Loctite on the knurl of the solid stop pad. Refer to Figure 1-18.
2. Put the solid stop pad in the hole in the imagesetter take-up platform. Refer to Figure 1-18.

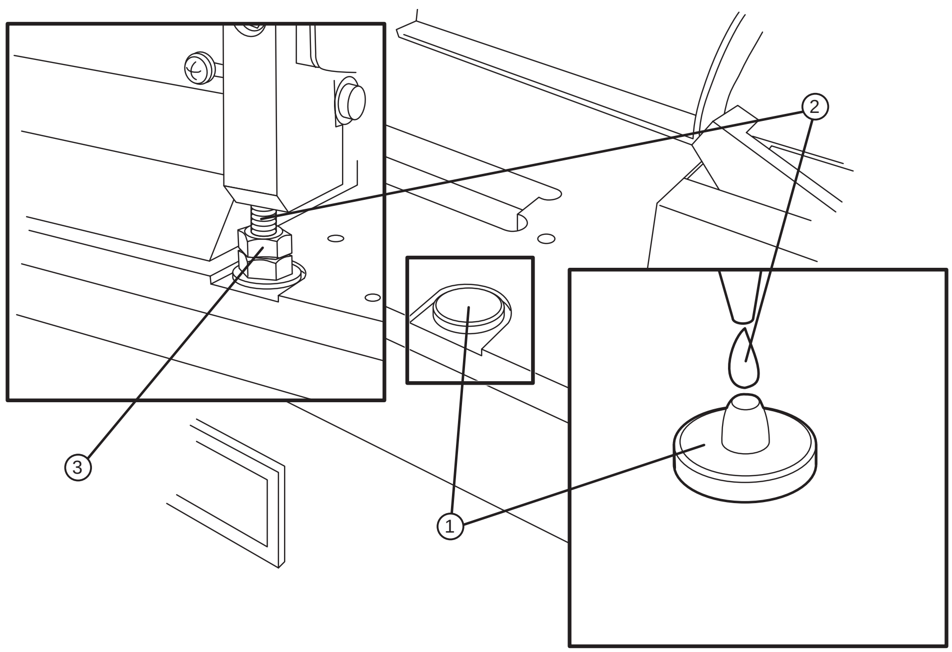


Figure 1-18 Aligning the solid stops.

①–Solid stop pad. ②–Put Loctite here (left and right). ③–Adjustment nuts.

3. Close the bridge, and put it in heavy mode.

   You can move the shuttle shaft manually, if the bridge is not already in heavy mode.
4. Screw the solid stop down against the stop pad of the take-up platform. Refer to Figure 1-18.
5. Using a 9/16" wrench, screw the top adjustment nut to the top and tighten it. Refer to Figure 1-18.

1.5.5 Setting up the DEC to Bridge/Buffer Interface

Tools required: Screwdriver

Steps

1. Using the four standoffs and nylon washers, install the Bridge/buffer interface board on the right wall of the imagesetter. Refer to Figure 1-19.

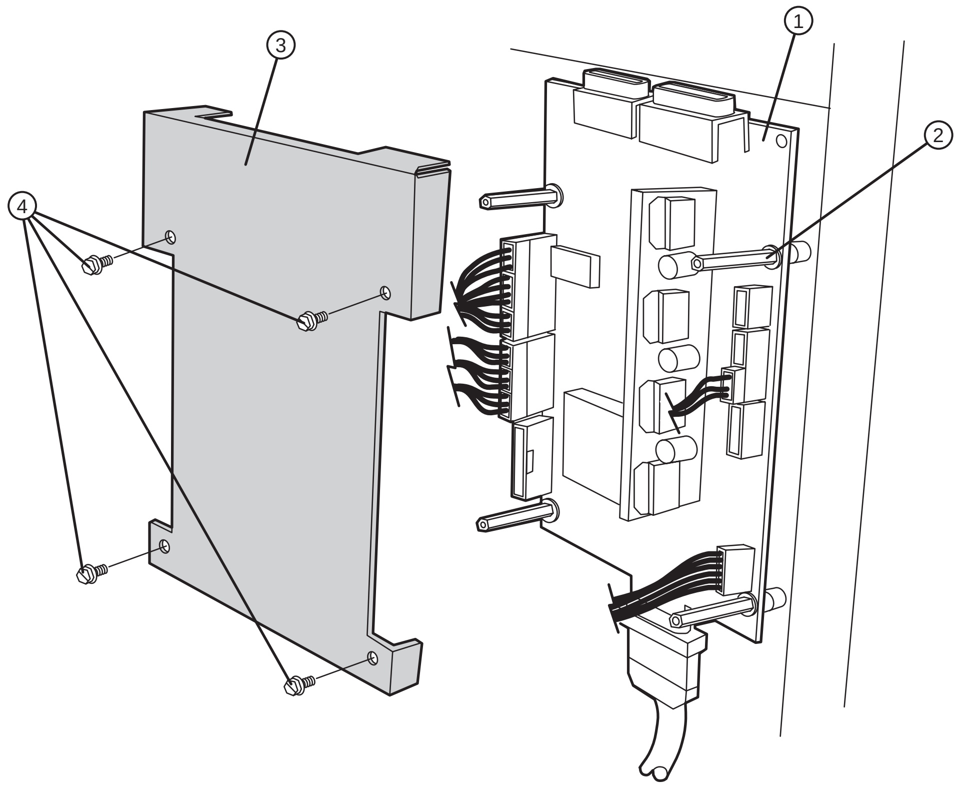


Figure 1-19 Attaching the bridge/buffer interface board.

①–Bridge/buffer interface board. ②–Standoff and nylon washer.
③–Interface board cover (attach after connectors are in place).
④–Four hex screws.

The interface board should be positioned so that the cable connector appears on the lower right. Refer to Figure 1-19.

NOTE: Do not attach the cover until the connector plugs are attached (see steps below).

2. Connect the interface board cable to the bottom of the interface board. Refer to Figure 1-20.
3. Pass the interface board cable through the left side of the fan housing and connect the cable with the DEC board on the right door. Refer to Figure 1-20.

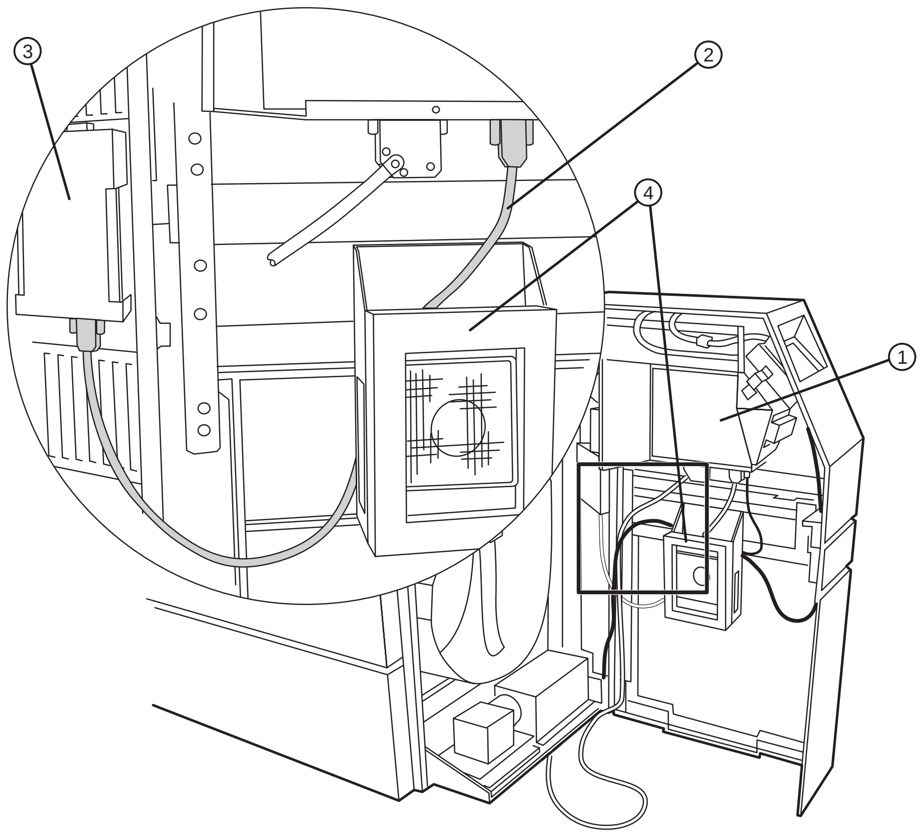


Figure 1-20 Routing and connecting the interface board cable.

①–DEC. ②–Interface board cable (bridge/buffer board to DEC). ③–Interface board. ④–Fan housing.

4. Beginning directly under the shuttle motor and working downward, tie wrap the bridge cables (include the interface platen cable).
5. Feed the cable bundle through the rubber grommet in the access hole.

   The access hole is located in the imagesetter frame below the access plate.
6. Wrap the wires under the shuttle motor into a P-clamp. Using a hex screw and two (2) star lock washers, secure the clamp to the bridge support casting.
7. Attach Velcro mesh wrap around the cables before they enter the rubber grommet and where they hang near the system casting.
8. Install the bridge connectors to the bridge/buffer board using the wire and plug designations shown in Figure 1-21.
9. Using the four (4) sems screws provided, attach the bridge/buffer housing cover (see Figure 1-19).

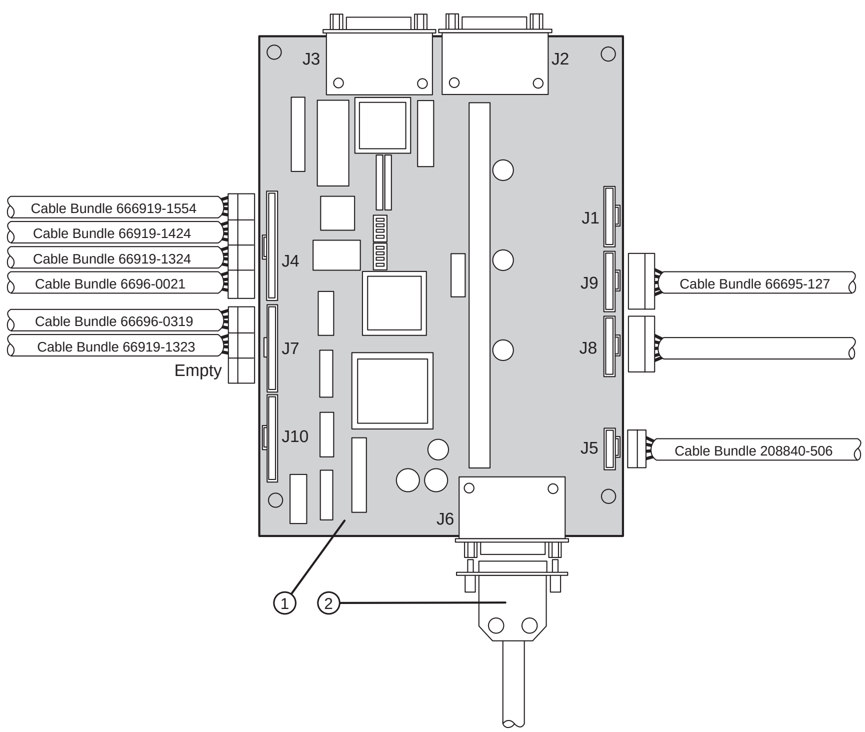


Figure 1-21 Attaching the connectors to the bridge/buffer interface board.
①–Bridge/buffer interface board. ②–Dec to bridge/buffer interface cable.

10. Using a P-clamp, secure the wires coming from the bridge/buffer interface board on the right. Secure the P-clamp to the frame using a sems screw.
11. Using a P-clamp, secure the wires coming coming from the bridge/buffer interface board on the left. Secure the P-clamp to the frame using a sems screw.

1.5.6 Attaching the Ground Wires

Tools required: Screwdriver

1. Remove the sems screw in the P-clamp located under the shuttle motor.
2. Attach the two (2) ground wires to the bottom of the P-clamp. Refer to Figure 1-22. Attach the hardware in the following order:
    a. star washer
    b. ground cable eyelet
    c. ground cable eyelet
    d. star washer
    e. P-clamp (with wire bundle)
    f. hex screw

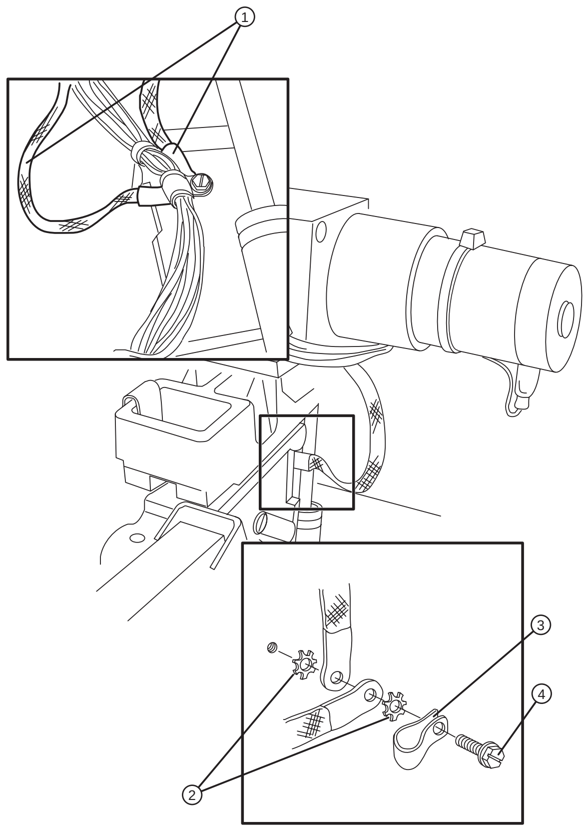


Figure 1-22 Attaching the ground cables.

①–Two ground cables. ②–Two star washers. ③–P-clamp. ④–Sems screw.

3. Replace the:
   - plasic access panels
   - side door
   - top cover
   - rear cover

Chapter 2:

Bridge Functional Analysis

2.1 Introduction

The internal bridge option integrates the Avantra and an on-line processor into one complete imaging system. Because the bridge is internal to the imagesetter, the usual long media transport path associated with bridges/on-line processors is greatly reduced. This provides better performance and more reliable operation. It also reduces the required floor space by approximately 30%.

This chapter provides information on the following:

Information to come.

Chapter 3:
Bridge Debugger Diagnostic Tool

3.1 Introduction

The bridge debugger software is a diagnostic tool built into the bridge/buffer module PCB. This tool has several features that aid in the debugging of bridge and buffer problems on the Avantra 36/44.

The debugger port software monitors the flow of bridge and buffer commands to and from the DEC. Monitoring takes place while the system runs in normal operation mode (not service mode). The debugger also provides a means for testing various components in the bridge/buffer area and for checking the status of all the bridge/buffer related sensors.

This chapter provides a detailed description for:

- Setting Up the Debugger Port
- Bridge Debugger User Interface
  - Terminal Code Identifiers
  - Bridge Unlock Sequence
  - Bridge States
  - Bridge State Responses
  - Bridge Error Codes
  - Bridge Sensor Status
  - Bridge Parameters
  - Bridge/Buffer Commands

3.2 Setting Up the Debugger Port

Access the bridge debugger port software using a terminal or PC running terminal emulation software (Procomm). The bridge/buffer module uses a 15-pin D-type connector requiring a special adapter cable to interface to the standard serial cable. Refer to Figure 3-1.

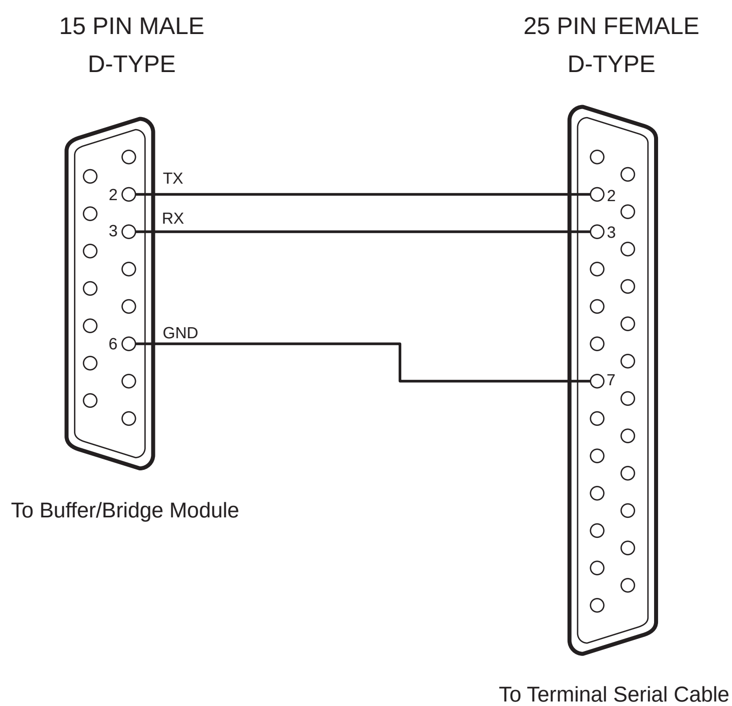


Figure 3-1 Avantra 36/44 Bridge Diagnostic Adapter Cable.

Use the following parts to interface from a PC to the bridge debugger port:

- 9-pin female connector (PC end) 78448-015
- 25-pin male connector (imagesetter end) 78448-016
- cable 78448-008
- bridge diagnostic adapter cable C03546-501

3.3 Bridge Debugger User Interface

This section describes the debugger user interface including:

- Terminal code identifiers
- Bridge states
- Error codes
- Bridge commands
- Sensor status information
- Parameters
- Bridge/buffer commands

3.1.1 Terminal Code Identifiers

i	Bridge Internal State
c	Command from DEC
d	Command from Debug Terminal
r	Response to Command (status or acknowledge)
s	Sensor Information
e	Error Code
l	Bridge is in a locked State
p	Parameter Value (high byte, low byte)

3.1.2 Bridge Unlock Sequence

The bridge must be unlocked by a special sequence prior to sending any normal bridge commands. If you attempt commands while the bridge is locked, the command echoes back preceded by an “l.” Note that the unlock sequence is automatically sent to the bridge/buffer module immediately after system boot-up (if OLP is enabled).

UNLOCK Sequence:	Codes sent from DEC:	c40	c20	c60
	Key Sequence from Terminal:	@	<SPACE>	‘

3.1.3 Bridge States

Bridge states display on the terminal when entering or changing an internal state. An “i” precedes a bridge state. A list of valid bridge states follows.

i0	Idle
i1	No Cut
i2	Center Wait
i3	Processor Wait
i4	Processor F Sensor Wait
i5	Processor Entry Wait
i6	Center Clear
i7	Buffer Entry Wait
i8	Buffer Purchase Wait
i9	Buffer to Bridge Clear Wait
i10	Bridge Clear
i11	Buffer to Processor Wait
i12	Processor Purchase Wait
i13	Buffer to Buffer Clear
i14	Buffer to Bridge Wait
i15	Buffer Clear
i16	Buffer Home Wait
i17	Start Cut Cycle
i18	Buffer Exit Wait
i19	Start Long Feed
i20	Start Buffer Flush

3.1.4 Bridge State Responses

Bridge state responses display on the terminal when entering or changing an internal state. An “r” precedes a bridge state. Valid bridge states follow.

r01	Error
r02	Ready
r03	Busy
r40	Command Acknowledge
r41	Invalid Mode
r42	Parameter Out Of Range
r43	Invalid Command
r44	Command Abort

3.1.5 Bridge Error Codes

Bridge error codes display on the terminal when an error condition occurs. An “e” precedes an error code. A list of bridge error codes follows.

e11	Center not reached
e12	Processsor not reached
e13	Center not cleared
e14	No lower encoder
e15	No upper encoder
e16	No media to take
e17	Buffer entry sensor not reached
e18	Buffer purchase sensor not reached
e1A	Bridge not cleared
e1B	Processor not reached by buffer
e1C	Buffer clear position not reached
e1D	Buffer not cleared
e1E	Bridge not reached by buffer
e1F	Buffer carriage home error
e20	Shuttle - Bridge mode not reached
e21	Shuttle - Cassette mode not reached

3.1.6 Bridge Sensor Status

The bridge sensor status displays on the terminal when a Sensor Request command (^F) is issued from the terminal. An “s” precedes the sensor status.

The sensor status is returned as a WORD value (two bytes). Each row of sensors (2 rows) are located in a separate byte. Row 1 (5 bits) is located in the lower byte; row 2 (5 bits) is located on the upper byte.

Sensors Located On Row 1 (Lower or Second Byte)

0001	Actuator Sensor
0002	Loop Sensor
0004	Bridge Purchase Sensor
0008	Shuttle - Bridge Mode Sensor
0010	Shuttle - Cassette Mode Sensor

Sensors Located On Row 2 (Upper or First Byte)

0100	Unused Sensor
0200	Buffer Entry Sensor
0400	Buffer Purchase Sensor
0800	Buffer at Bridge Sensor (home)
1000	Buffer at Processor Sensor

3.1.7 Bridge Parameters

Use the bridge parameters with the Set/Get Parameters command.

NOTE: These comand/parameters are not normally used for troubleshooting.

0	Nominal speed
1	Max Torque
2	Steps to Processor
3	DC Motor Speed
4	Stepper Import Speed
5	Stepper Length
6	Nominal Slow Speed
7	Stepper Export Speed

3.1.8 Bridge/Buffer Commands

Send commands to test specific components directly to the bridge/buffer module via the terminal by typing in the approriate key sequence. The following lists command numbers, key sequences, and description of available bridge/buffer commands. A “c” precedes the bridge/buffer commands if the command was sent from the DEC. A “d” precedes if the command was sent from the debug terminal.

^@	00	Null Command
^a	01	Status Request
^b	02	Servo1 ON (fast)
^c	03	Servo1 OFF
^d	04	Abort Operation
^e	05	Cut /Transport
^f	06	Sensor Request
^g	07	Clear Error
^h	08	Front Processor ON
^i	09	Front Processor OFF
^j	0A	Back Processor ON
^k	0B	Back Processor OFF
^l	0C	Bridge Slow Speed
^m	0D	Bridge Fast Speed
^n	0E	Buffer Roller Fast Speed
^o	0F	Buffer Roller Slow Speed
^p	10	Set Parameter
^q	11	Short Feed
^r	12	Soft Reset
^s	13	Get Parameter
^t	14	Move Shuttle to Light Mode
^u	15	Move Shuttle to Heavy Mode
^v	16	Shuttle OFF
^w	17	Brake ON CW
^x	18	Brake ON CCW
^y	19	Brake OFF
^z	1A	Move Carriage to Bridge (Buffer)
^[	1B	Move Carriage to Processor (Buffer)
^\	1C	Carriage OFF
^]	1D	Move Carriage Home (bridge)
^^	1E	OLP Revision
^_	1F	OLP State Request

Chapter 4:

Bridge Component Removal/Replacement Procedures

4.1 Introduction

This section describes the procedures used when removing and replacing components in the bridge.

The following topics describe the required sequence:

- Removing and Replacing the Bridge Foot
- Media Purchase Sensor
- Bridge Loop Sensor
- Upper Bridge Servo Motor
- The Activator Switch
- The Bridge Up Sensor
- Bridge Shuttle Motor
- Shuttle Light and Heavy Sensors

4.2 Removing and Replacing the Bridge Foot

Tools: None

Remove:

1. Put the bridge in the down position and in heavy mode.
2. Unscrew the two (2) thumb screws, one on each side of the foot. Refer to Figure 4-1.

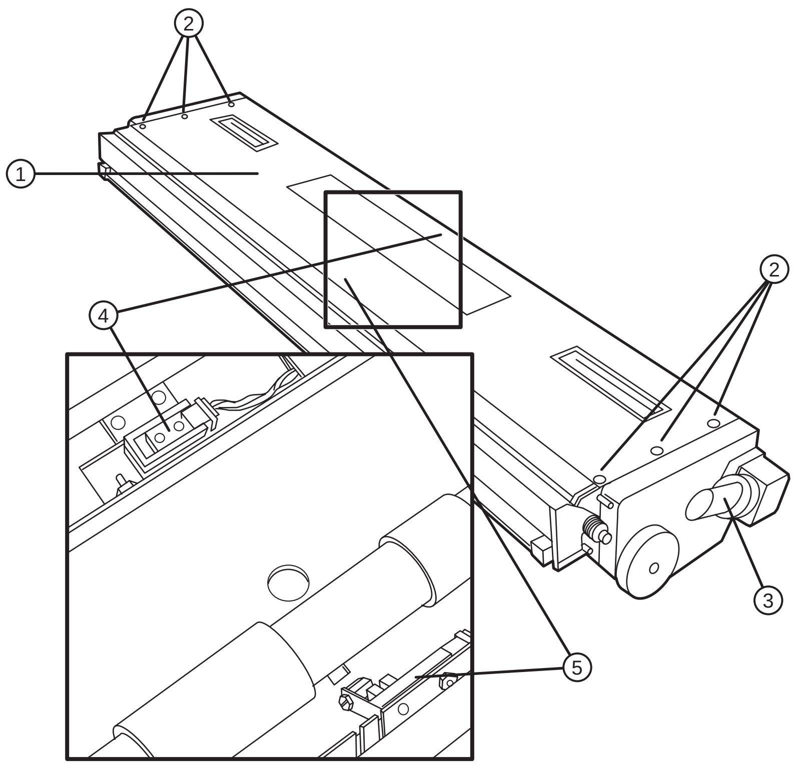


Figure 4-1 Bridge foot.

①–Foot face plate. ②–Six (three each side) face plate screws. ③–Two thumb screws. ④–Media purchase sensor connector. ⑤–Loop sensor connector.

3. Lift the bridge and pull the foot out.

Replace:

1. Reverse the procedures above.

4.3 Media Purchase Sensor

Tools: Phillips screwdriver, 3/16" allen wrench

Remove:

1. Remove the six (6) screws, three (3) on each side, of the bridge foot face plate. Refer to Figure 4-1.
2. Remove the media purchase sensor connector. Refer to Figure 4-1.
3. Using a 3/16" allen wrench, remove the holding screw.

Replace:

1. Reverse the procedure above.

4.4 Bridge Loop Sensor

Tools: Phillips screwdriver, 5/16" open end wrench

Remove:

1. Remove the six (6) screws, three (3) on each side, of the bridge foot face plate. Refer to Figure 4-1.
2. Remove the bridge loop sensor connector. Refer to Figure 4-1.
3. Using a 5/16" open wrench, remove the holding nut.

Replace:

1. Reverse the procedure above.

NOTE: Adjust the upper bridge servo motor (slow and fast speed).

4.5 Upper Bridge Servo Motor

Tools: Phillips head screwdriver, flathead screwdriver, allen head wrench

Remove:

1. If the bridge foot is on, put the system in light mode and turn the system off.
2. Using a phillips head screwdriver, remove the six (6) screws from the bridge side cover on the right. Refer to Figure 4-2.

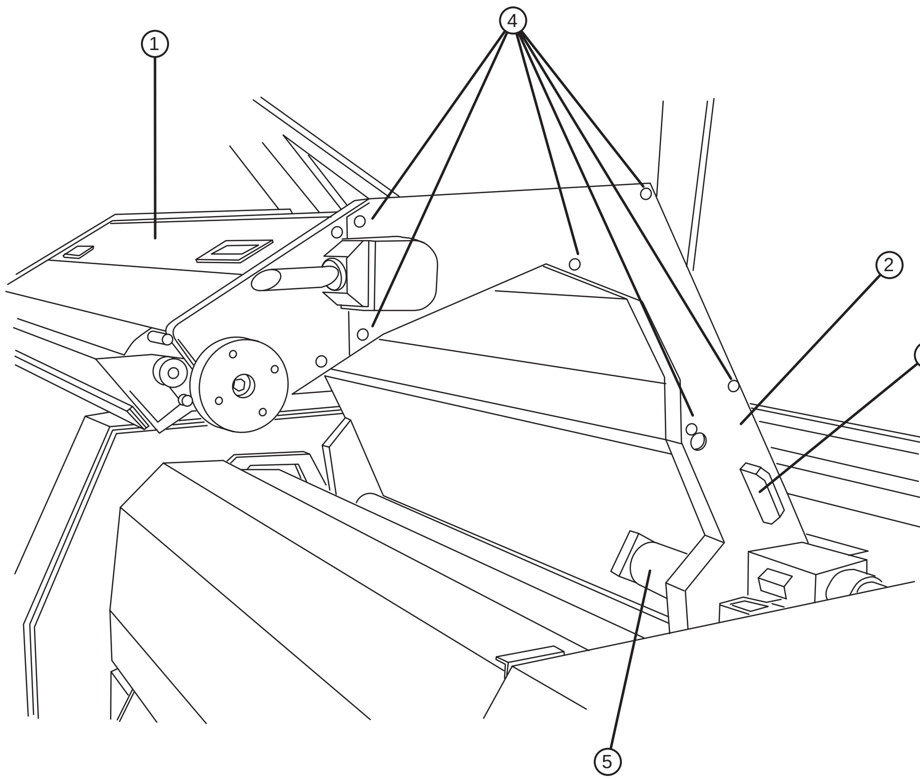


Figure 4-2 Bridge side cover.

①–Bridge. ②–Side cover. ③–Electrical connector.
④–Six side cover screws. ⑤–Upper bridge servo motor.

3. Remove the electrical connector. Refer to Figure 4-2.
4. Remove the female connector from the other side of the cover. Refer to Figure 4-3.
5. Remove the connector from the bridge up sensor to release the side cover. Refer to Figure 4-3. Move the cover away.
6. Remove the power connectors (red on top; brown on bottom) from the upper bridge servo motor. Refer to Figure 4-2 and 4-3.

7. Using a large flathead screwdriver, remove the two (2) servo motor mounting screws. Refer to Figure 4-3.
8. Using an allen head wrench, remove the two set screws from the servo motor gear. Refer to Figure 4-3.
9. Remove the gear from the motor. Refer to Figure 4-3.

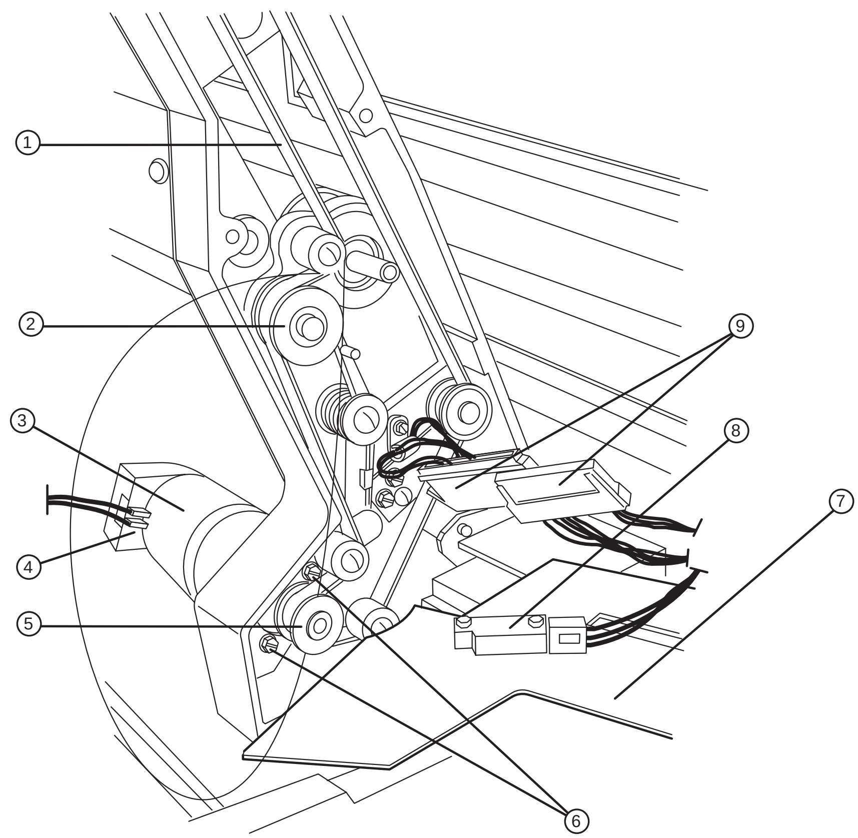


Figure 4-3 Bridge side cover exposed view.

①–Drive belt. ②–Tensioner assembly. ③–Upper bridge servo motor. ④–Motor power connectors (red and brown). ⑤–Servo motor gear with allen screws. ⑥–Two servo motor mounting hex screws. ⑦–Side cover. ⑧–Bridge up sensor. ⑨–Side cover electrical connector.

Replace:

1. Replace the gear on the motor.
2. Reverse the procedures above.

4.6 The Activator Switch

Tools: Phillips head screwdriver, flathead screwdriver

Remove:

1. Using a phillips head screwdriver, remove the three (3) cover screws. Refer to Figure 4-4.
2. Disconnect the switch connectors. Refer to Figure 4-4.
3. Using a flathead screwdriver, remove the two switch mounting screws. Refer to Figure 4-4.

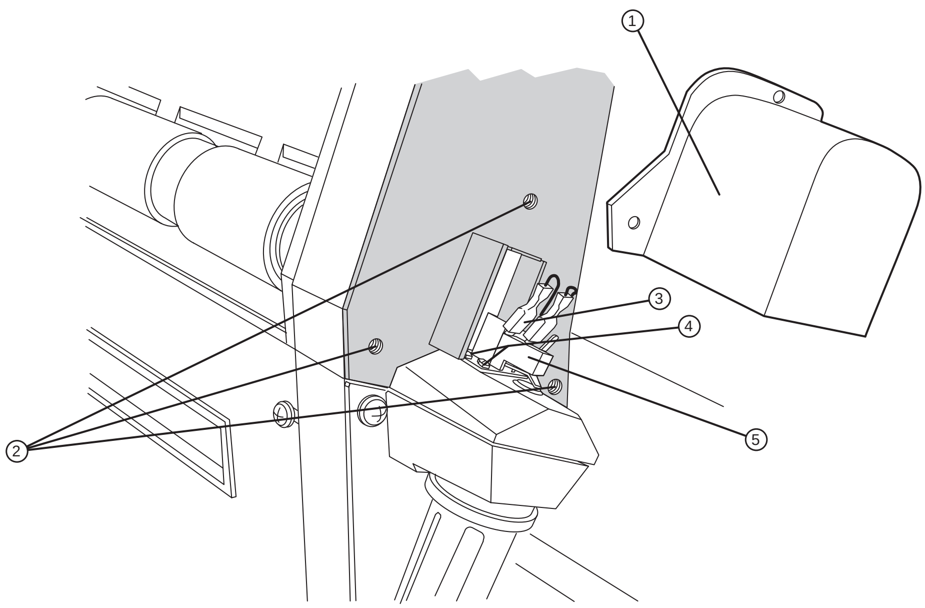


Figure 4-4 Activator switch.

①–Cover. ②–Three cover screws. ③–Switch connectors.
④–Two switch mounting screws. ⑤–Activator switch.

Replace:

1. Reverse the procedures above.

4.7 The Bridge Up Sensor

Tools: Phillips head screwdriver

Remove:

1. If the bridge foot is on, put the system in light mode and turn the system off.
2. Using a phillips head screwdriver, remove the six (6) holding screws from the bridge side cover on the right. Refer to Figure 4-2.
3. Remove the connector from the bridge up sensor. Refer to Figure 4-5.
4. Remove the sensor connector. Refer to Figure 4-5.
5. Using a 1/4" open end wrench, remove the two (2) nuts securing the sensor to the cover. Refer to Figure 4-5.

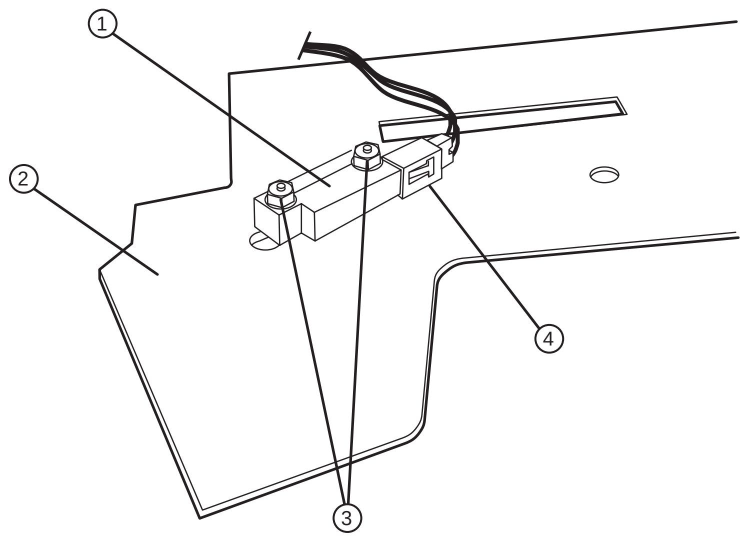


Figure 4-5 Bridge up sensor.

①–Bridge up sensor. ②–Side cover. ③–Securing nuts.
④–Sensor connector.

Replace:

1. Reverse the procedure above.

4.8 Bridge Shuttle Motor

Tools: Allen head wrench, flathead screwdriver

Remove:

1. Put the bridge in the up position.
2. Remove the allen head screw from the motor cover on the left. Refer to Figure 4-6.
3. Put the bridge in the down position to remove the two (2) remaining allen head screws on the front of the cover. Refer to Figure 4-6.
4. Remove the two (2) power connectors from the bottom of the motor. Note the wire positions for replacement. Refer to Figure 4-6.

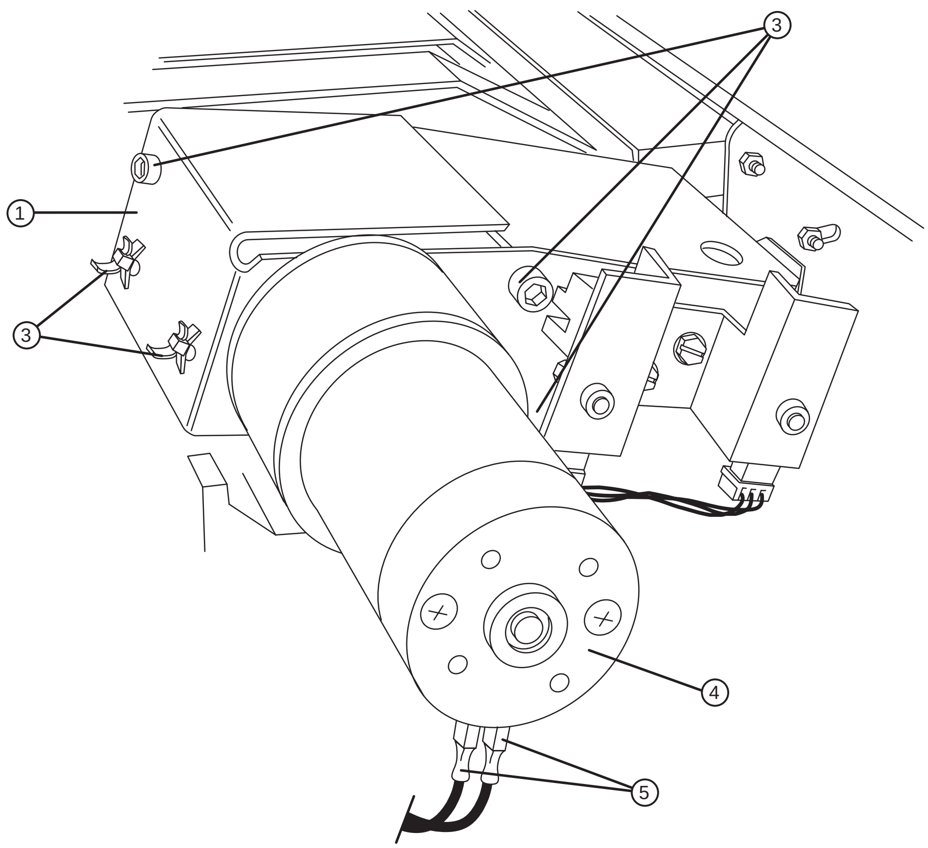


Figure 4-6 Bridge shuttle motor.

①–Bridge shuttle motor cover. ②–Three allen screws. ③–Tie wraps.
④–Bridge shttle motor. ⑤–Two power connectors.

5. Using a flathead screwdriver, remove the two (2) motor mounting screws. Refer to Figure 4-7.

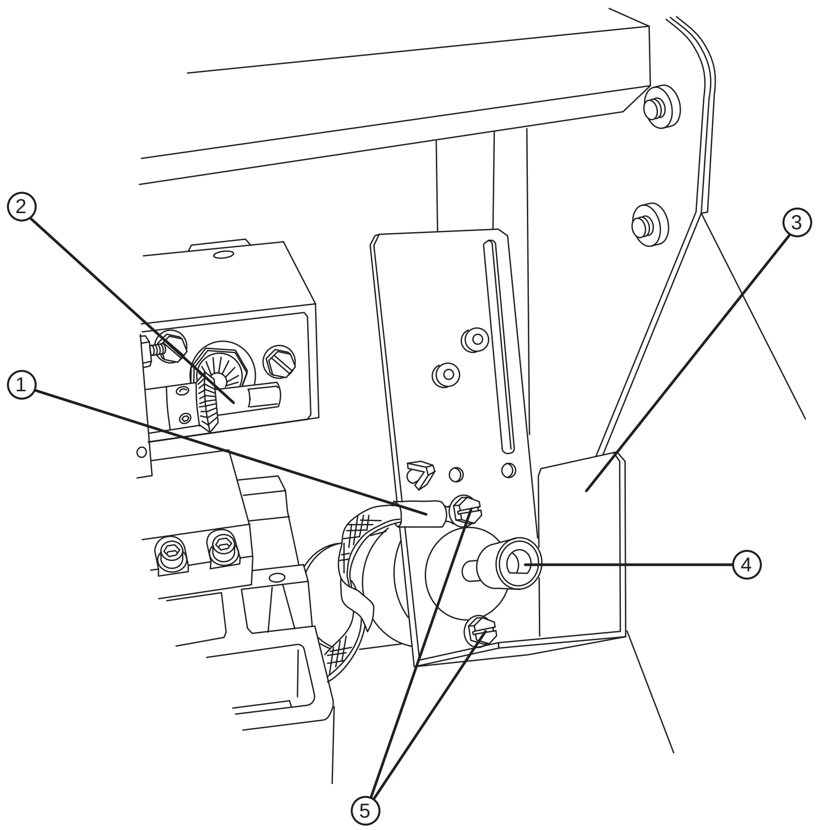


Figure 4-7 Motor mounting screws and coupling.

①–Anti-static cable. ②–Shaft. ③–Cover. ④–Coupling. ⑤–Two mounting screws.

Replace:

1. Reverse the above procedure.
2. Put the system through a practice run to make certain that the motor runs properly.

4.9 Shuttle Light and Heavy Sensors

Tools: Flathead screwdriver

Remove:

1. Using a flathead screwdriver, remove the two (2) mounting screws. Refer to Figure 4-8.

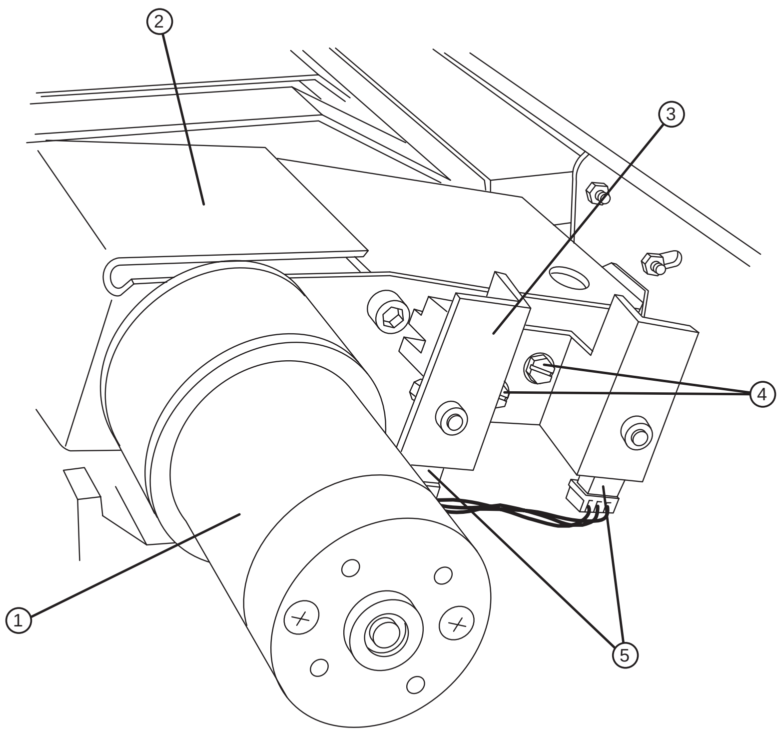


Figure 4-8 Shuttle light and heavy sensor assembly.

①–Bridge shuttle motor. ②–Cover. ③–Shuttle light and heavy sensor assembly. ④–Two mounting screws. ⑤–Two sensor assembly connectors.

2. Remove the two (2) sensor connectors. Refer to Figure 4-8.
3. Remove the single screw securing the sensors in place.

Replace:

1. Reverse the above procedures.
2. Put the system through a practice run to make certain that the sensors run properly.

Appendix A
Spare Parts

Bridge

209686-503	Bridge/Buffer driver module	AV36S/44S
209686-501/503	*Bridge/Buffer driver module	AV36/44
209684-501	Bridge foot interlock boards	AV36/44/36S/44S
067324-001	Bridge gas shocks	AV36/44/36S/44S
066481-004	Bridge driver servo motor	AV36/44/36S/44S
066481-005	Bridge shuttle DC gear motor	AV36/44/36S/44S
066719-001	Slack loop sensor	AV36/44/36S/44S
066719-001	Shuttle position sensors	AV36/44/36S/44S
066721-002	Bridge foot purchase sensor	AV36/44/36S/44S
065938-001	Bridge foot micro-switch	AV36/44/36S/44S
056461-084	Bridge timing belt	AV36/44/36S/44S
066393-001	Bridge up sensor	AV36/44/36S/44S

* Depends on the software loaded in the system. Refer to OMNI document (50.552).

Index

Section III: Buffer

Chapter 1:
Buffer Installation

1.1 Introduction

This chapter provides information for unpacking, unlocking and installing the Avantra 36/44 buffer.

Included in this chapter are:

- Buffer Installation Procedures
    - Unpacking the Buffer
    - Unlocking the Buffer
    - Installing the Buffer to the Imagesetter

1.2 Buffer Installation Procedures

1.2.1 Unpacking the Buffer

The buffer ships in a single cardboard box attached to a wooden pallet (see Figure 1-1).

Tools: Strap cutters, 7/16¨ hex wrench, 9/16¨ hex wrench

Steps:

1. Cut the two (2) straps around the cardboard sleeve and remove the top cardboard cover. Refer to Figure 1-1.

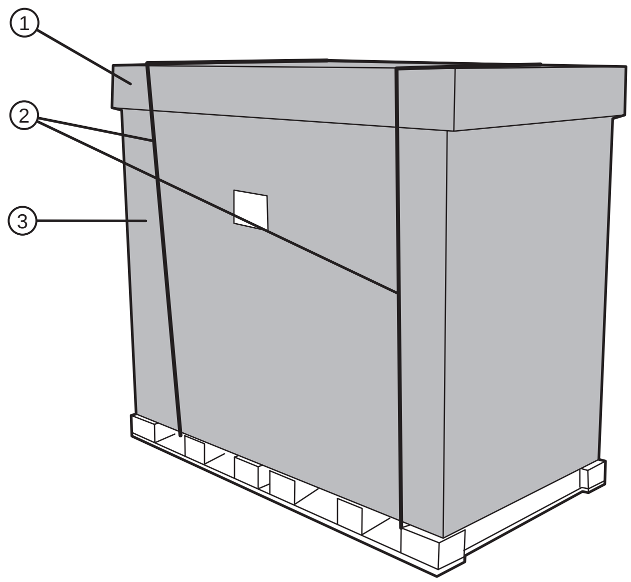


Figure 1-1 The buffer shipping box.

①–Box cover. ②–Shipping straps (2).
③–Shipping box.

2. Remove the two (2) foam spacers at the top. Refer to Figure 1-2.
3. Lift the cardboard sleeve straight off the pallet.
4. Cut the shipping straps going around the unit frame. Refer to Figure 1-2.

   These straps hold the unit's top cover in place.

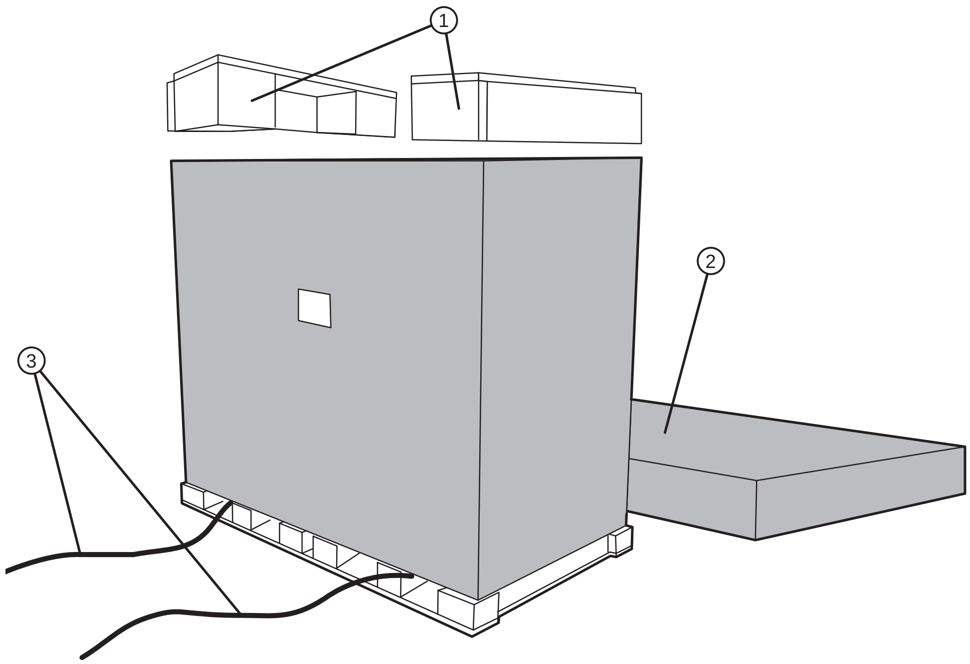


Figure 1-2 Removing the box, spacers and straps.

①–Foam spacers (2). ②–Box cover.
③–Shipping straps (2).

5. Using a 7/16¨ hex wrench, remove the two (2) bolts in each of the outriggers at the bottom rear of the unit. Refer to Figure 1-3.

NOTE: Remove the outriggers at the rear of the unit only.

6. Using a 9/16¨ hex wrench, remove the two (2) bolts from the bottom left and two (2) bolts from the bottom right of the pallet. Refer to Figure 1-3.
7. Remove the anti-static bag covering the unit.

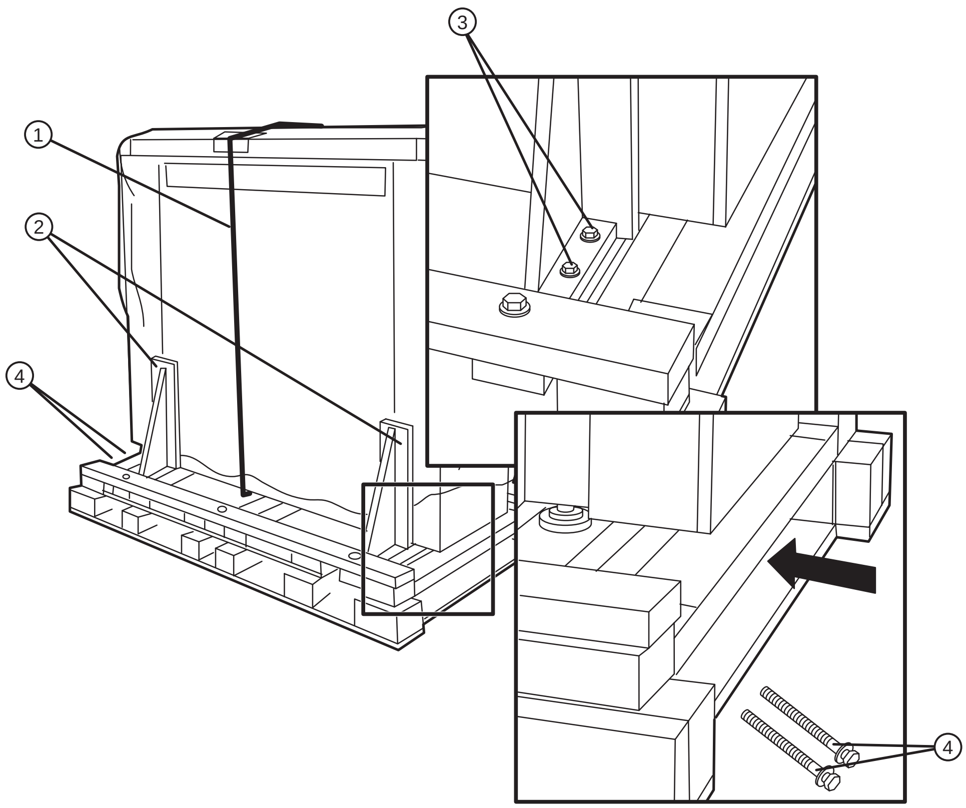


Figure 1-3 Removing the rear outriggers and pallet bolts.

①–Shipping strap. ②–Two rear outriggers.
③–Two 7/16¨ hex outrigger bolts. ④–Pallet bolts (located under unit).

8. Remove the unit's bottom side panels (left and right) by pulling them straight out. Refer to Figure 1-4.

CAUTION: The side panels attach to the unit by means of a lock pin at each of the four corners. Do not tilt the side panels, or the lock pins could bend or snap.

WARNING: Four persons must be used for lifting the unit.

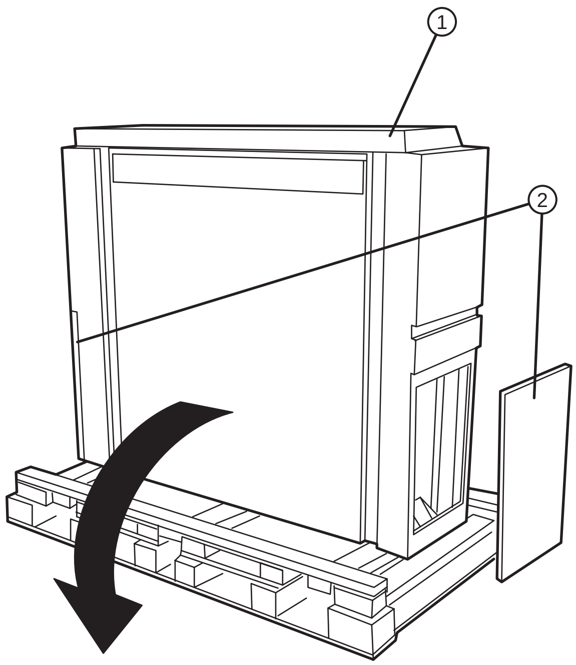


Figure 1-4 Removing the side panels.

①–Top cover. ②–Side panels.

9. Each person must grip the unit at the top of the side panel opening. Refer to Figure 1-4. Lift the unit free of the pallet, and set the unit on the floor.

WARNING: Do not try to lift the buffer unit from the top, nor should it be tilted. The top cover on the unit is not attached and will come off.

10. Replace the side panels at the bottom of the unit frame. Refer to Figure 1-4.

CAUTION: Do not force the side panels back into place. Doing so could bend and break the lock pins.

1.2.2 Unlocking the Buffer

The buffer comes with a kit for preparing the unit. Check the kit's contents against the hardware shown in Figure 1-5.

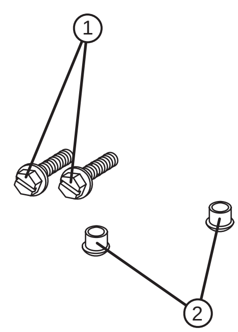


Figure 1-5 Hardware for preparing the buffer.

①–Two hex bolts (for buffer/imagesetter interface). ②–Plastic plugs.

Steps:

1. To unlock the buffer carriage, remove the two (2) shipping screws from the top rear of the buffer. Refer to Figure 1-6.

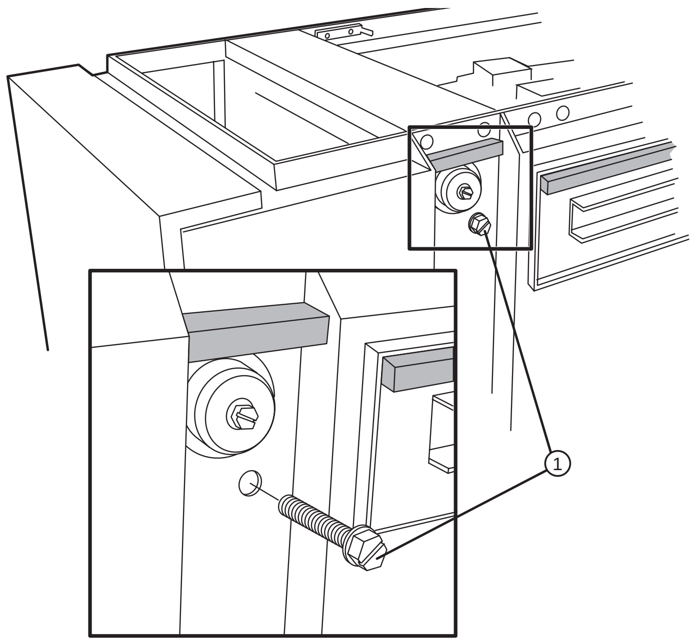


Figure 1-6 Unlocking the carriage lock bolts.

①–Buffer carriage lock bolt (1 of 2, left and right).

2. Insert the plastic plugs (see Figure 1-5) in the two (2) shipping screw holes. Refer to Figure 1-7.

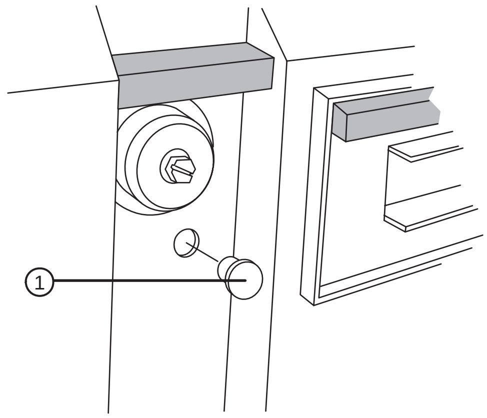


Figure 1-7 Placing the plastic plugs and foam pads.

①–Plastic plug (1 of 2).

3. To unlock the buffer input platen, remove the two (2) lockdown bolts.

   The lockdown bolts are located on the left and right portion of the platen near the hinge screws. Refer to Figure 1-8.

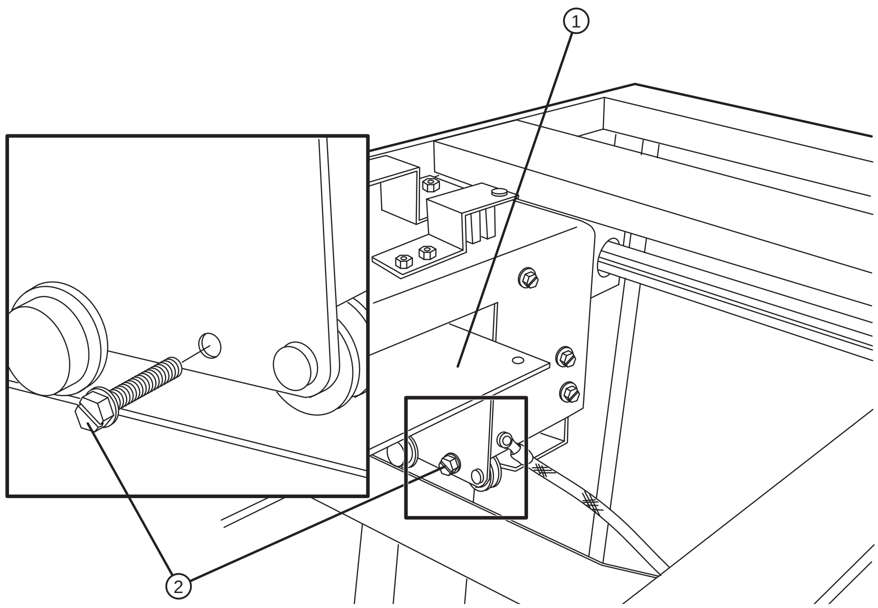


Figure 1-8 Removing the platen lockdown bolts.

①–Platen. ②–Platen lockdown bolt (1 of 2).

1.2.3 Installing the Buffer to the Imagesetter

The imagesetter comes with an accessories kit, which contains the necessary parts for connection the buffer to the imagesetter. Check the contents of the accessories box with the hardware illustrated in Figure 1-9.

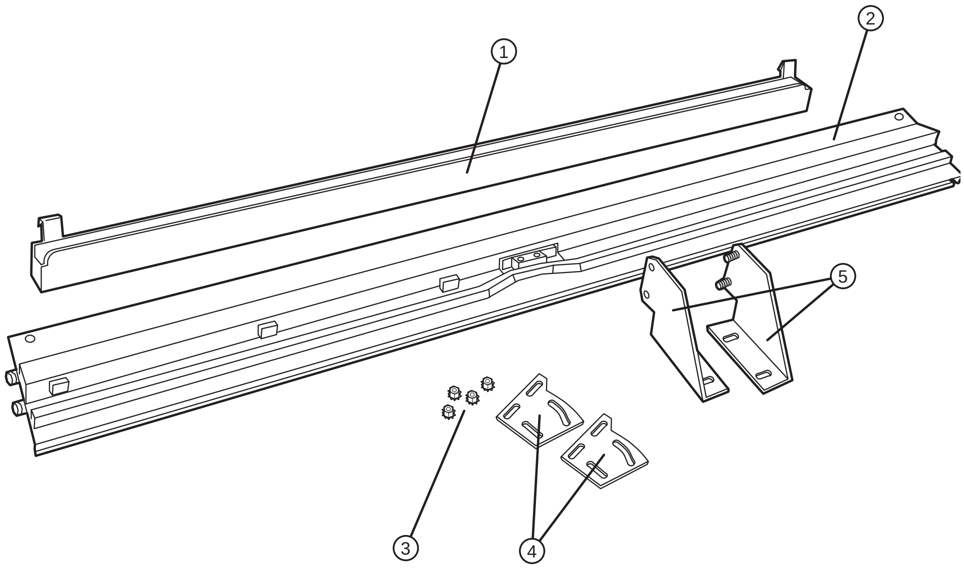


Figure 1-9 Accessories for attaching the imagesetter to the buffer (and for imagesetter installation).

①–Chafe tray. ②–Extension platen. ③–Nuts for attaching the side plates to the platen and the brackets to the imagesetter frame. ④–Side plates. ⑤–Brackets.

The extension platen and related hardware are used when attaching the imagesetter to the buffer. The chafe tray is inserted as part of the imagesetter installation procedures. See the *Avantra 36/44 Imagesetter Service Manual*.

Steps:

1. Remove the back panel from the Imagesetter. Refer to Figure 1-10.
2. Raise the imagesetter front cover, light shield and bridge.
3. Attach the left and right side plates to the extension platen using the four (4) nuts and bolts provided. Refer to Figure 1-10 and Figure 1-11.

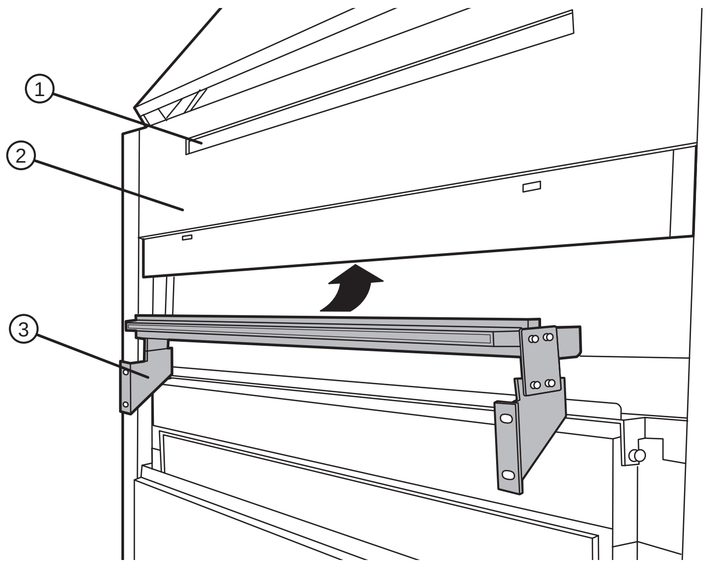


Figure 1-10 Inserting the extension platen at the rear of the imagesetter.

①–Exit platen opening. ②–Imagesetter rear with back panel removed. ③–Extension platen assembly.

4. Attach the left and right brackets to the side plates using the nuts provided. Refer to Figure 1-10 and Figure 1-11.

NOTE: **Keep the nuts loose on the side plates and brackets so that the extension can be easily shifted for proper adjustment.**

5. Remove the back panel at the rear of the imagesetter.

6. Connect the cable to the sensor on the extension platen prior to installing the extension platen.
7. Insert the extension platen through the opening and position the platen at the inside rear of the imagesetter. Refer to Figure 1-10 and Figure 1-11.
8. Hang the platen brackets on the studs jutting from the imagesetter frame.
9. Remove the imagesetter plastic access panels (left and right) to get at the studs and brackets. Attach the brackets left and right to the studs using the two (2) nuts provided. Refer to Figure 1-11.

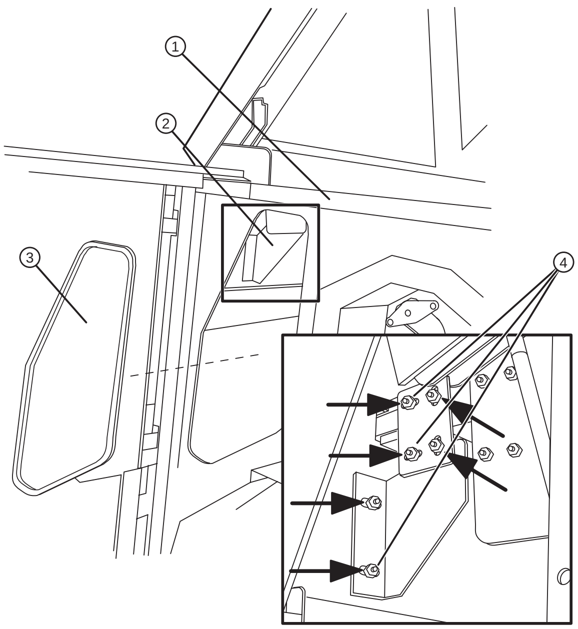


Figure 1-11 Attaching the extension platen to the imagesetter.

①–Inside rear of imagesetter. ②–Extension platen brackets. ③–One of two imagesetter access covers (left and right). ④–Hex nuts attaching brackets to the extension platen (four at the top) and the inside rear of the imagesetter (two at the bottom). Do not tighten the nuts.

10. Slide the extension platen toward the rear of the imagesetter.

CAUTION: Before proceeding to the next step make certain that no interference exists between the bridge (when it is lowered) and the edge of the extension platen.

11. Lower the bridge.
12. Slide the extension platen toward the bridge. Using the two (2) platen alignment pins provided, align the holes on the bottom of the bridge platen (left and right) with the holes in the extension platen. Refer to Figure 1-12.

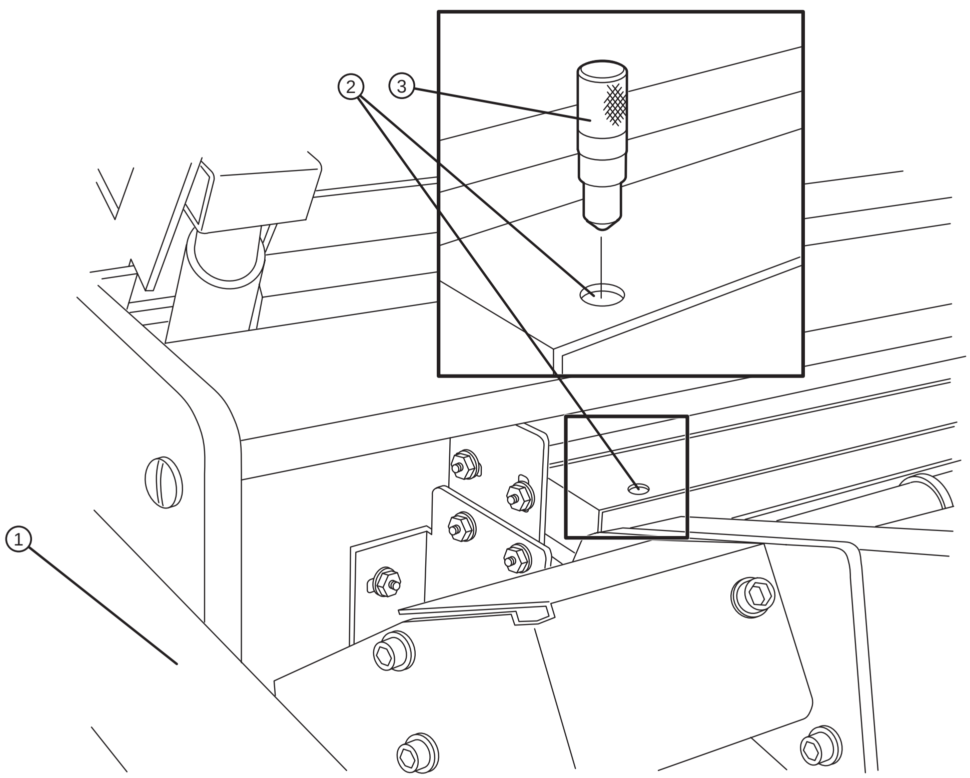


Figure 1-12 Aligning the bridge platen and extension platen.

①–Imagesetter. ②–Alignment hole on the extension platen.
③–One of two alignment pins provided.

13. Leaving the platen alignment pins in place, tighten the four (4) nuts (each end) on the brackets attached to the extension platen. Refer to Figure 1-11.

CAUTION: With the bracket tightly secured against the extension platen, check that the set of alignment holes in the bridge still line up with the set in the extension platen. If the holes do not align, loosen the nuts and repeat Steps 11 and 12.

14. Place the labels provided over the top of the extension platen alignment holes.

    The labels prevent light leakage.

15. Move the buffer against the imagesetter.

    The imagesetter extension platen should fall within the buffer platen.

16. Screw the buffer leveling feet about one full turn so that the buffer is flat against the imagesetter. Align the mounting holes by adjusting the leveling feet. Refer to Figure 1-13.

NOTE: Lowering the feet takes pressure off the securing screws, which are used to attach the buffer and imagesetter in the next step.

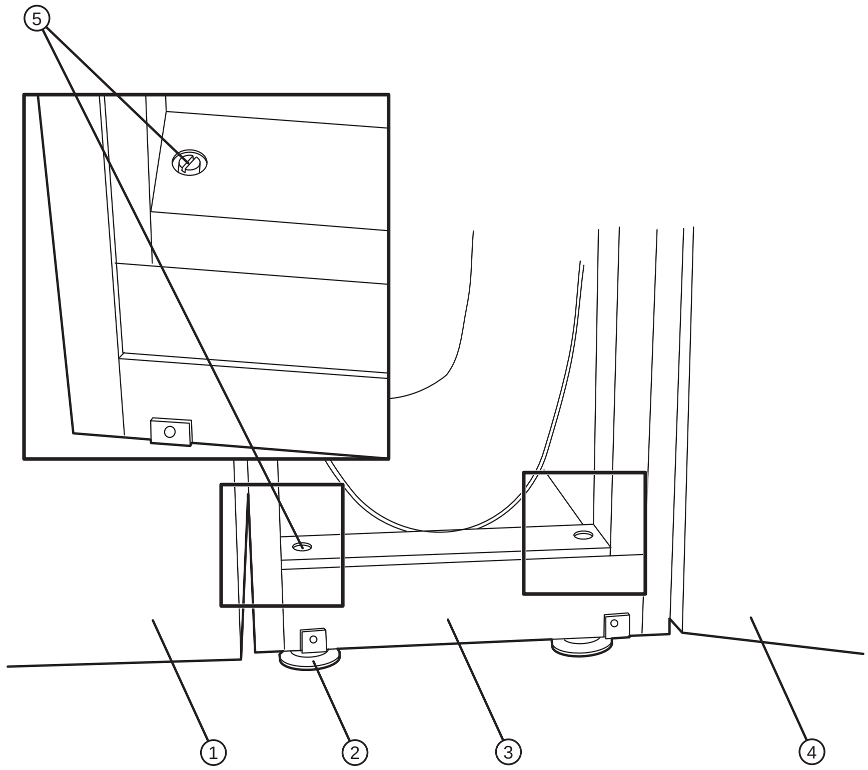


Figure 1-13 The buffer's adjustable legs.

①–OLP. ②–Adjustable leg. ③–Buffer.
④–Imagesetter. ⑤–leg adjustment screws.

17. Secure the buffer to the imagesetter using the two (2) #10-32 x 1/4¨ sems screws, one at each end of the buffer platen at the top corners.

    The screws pass through the buffer platen from the inside and into the threaded inserts at the back of the imagesetter. Refer to Figure 1-14.

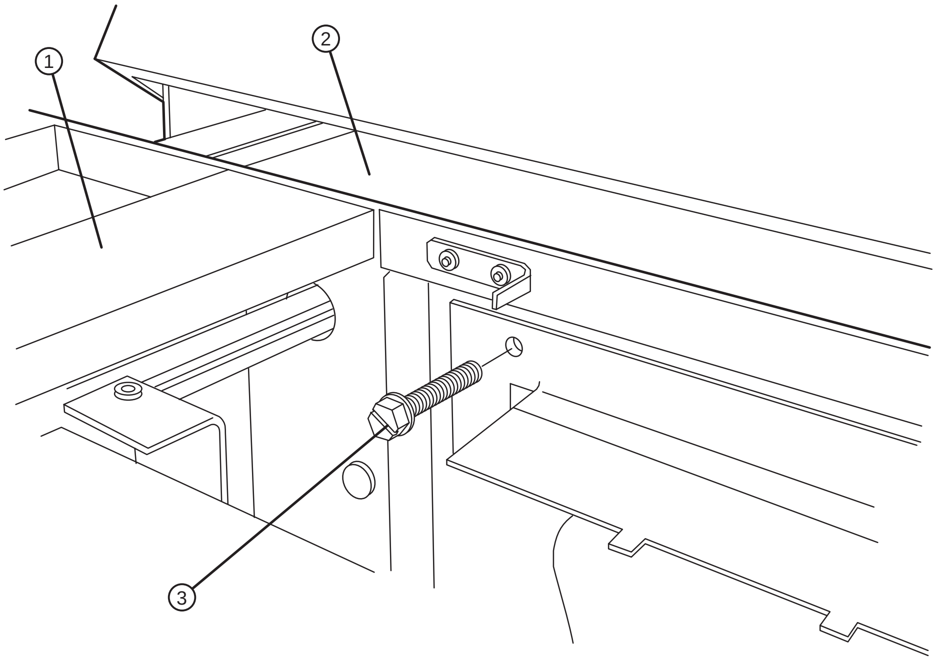


Figure 1-14 Securing the buffer to the imagesetter.

①–Buffer. ②–Imagesetter.
③–Hex bolt (1 of 2).

18. Open the right side door on the imagesetter. See the *Avantra 36/44 Imagesetter Service Manual*, Chapter 4, Section 4.2.1 Right/Left Side Covers.
19. Remove the black plastic plug located at the bottom and inside rear of the imagesetter.
20. Open the lower right panel on the buffer by pulling the panel straight out (see Figure 1-4).

21. Press the gasket membrane provided (see Figure 1-5) onto the buffer at the harness hole. Refer to Figure 1-15.

    The harness hole is located on the right hand side of the buffer at the front and near the bottom.

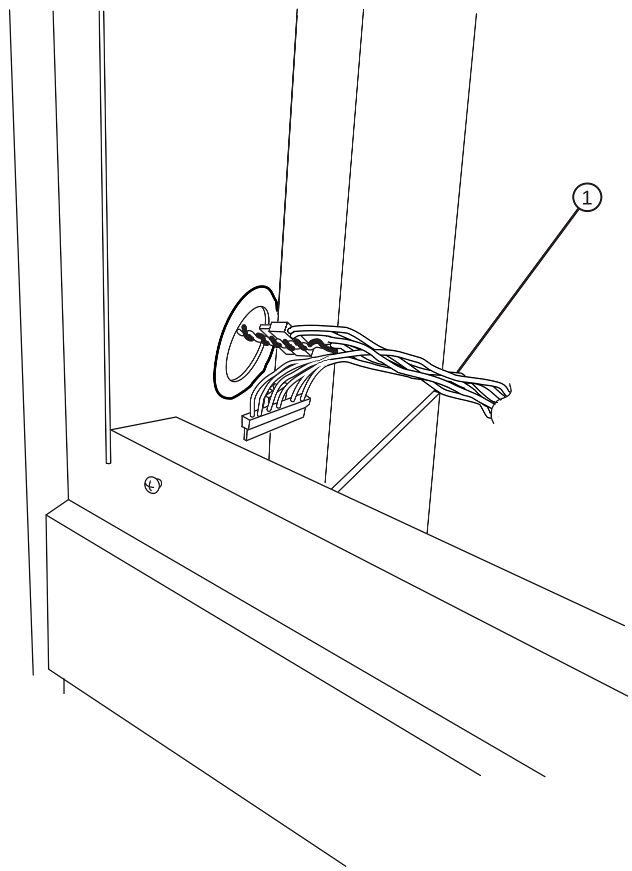


Figure 1-15 Routing the buffer harness cable through hole (right, bottom, inside front).

①–Wire bundle.

22. Route the wire bundle through the rubber gasket and into the imagesetter. Refer to Figure 1-15.

23. Plug the wires into the buffer/imagesetter interface board at the four points shown in Figure 1-16.

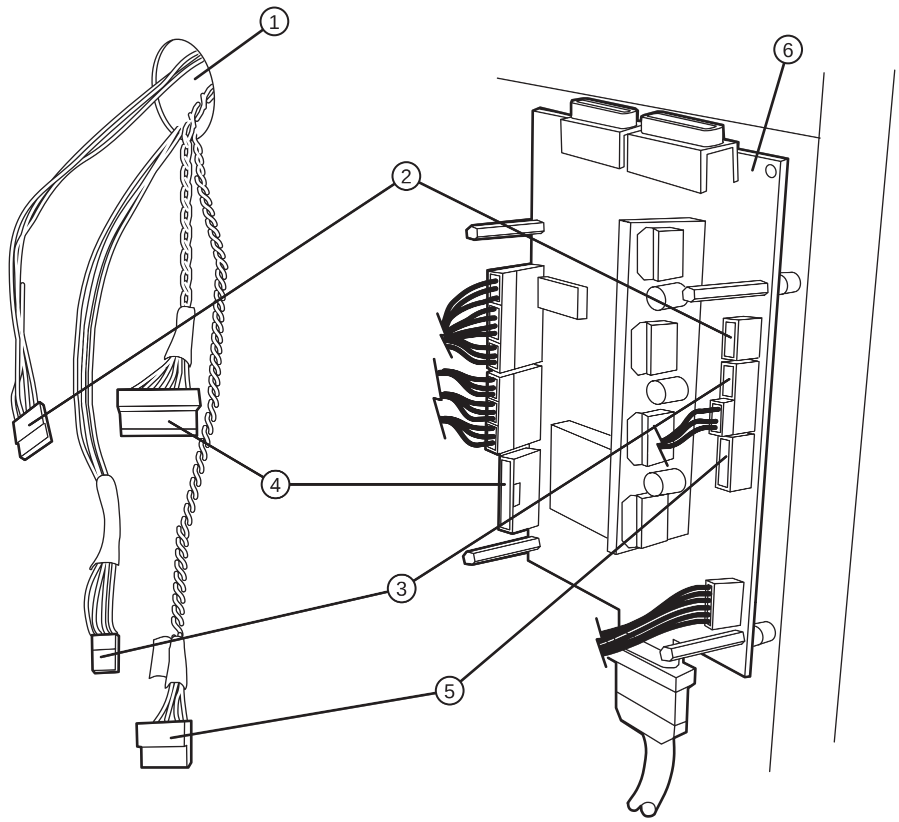


Figure 1-16 Attaching the buffer wires to the buffer/imagesetter interface board.

①–Buffer to Imagesetter harness opening. ②–Connector. ③–Connector. ④–Connector. ⑤–Connector. ⑥–Interface board.

NOTE: See the *Avantra 36/44 OLP Service Manual*, for the OLP attachment procedures and for attaching the anti-static wire.

1.2.4 Aligning the Buffer Carriage

This procedure is performed after the buffer is attached to the imagesetter.

1. Remove the buffer top cover.
2. Bring the carriage to the front (toward the imagesetter) of the buffer. Hold the carriage tightly against the frame.

   If both ends of the carriage are flush against the frame, nothing else is required.

   If the carriage is not flush, go to Step 3.
3. For older buffers:

   a. Remove the four (4) screws in the braces on the left and right hand side of the buffer. Refer to Figure 1-17. Lift the braces off.

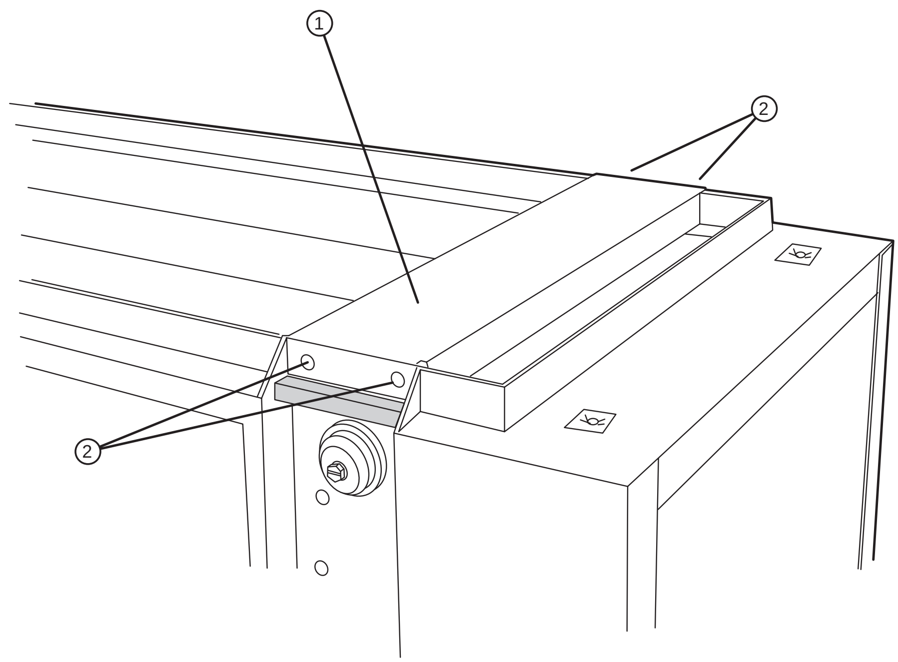


Figure 1-17 Older buffer brace.

①–End brace. ②–Four end brace screws (two each side).

For newer buffers:

b. The braces will have access holes and will not need to be removed. Refer to Figure 1-18.

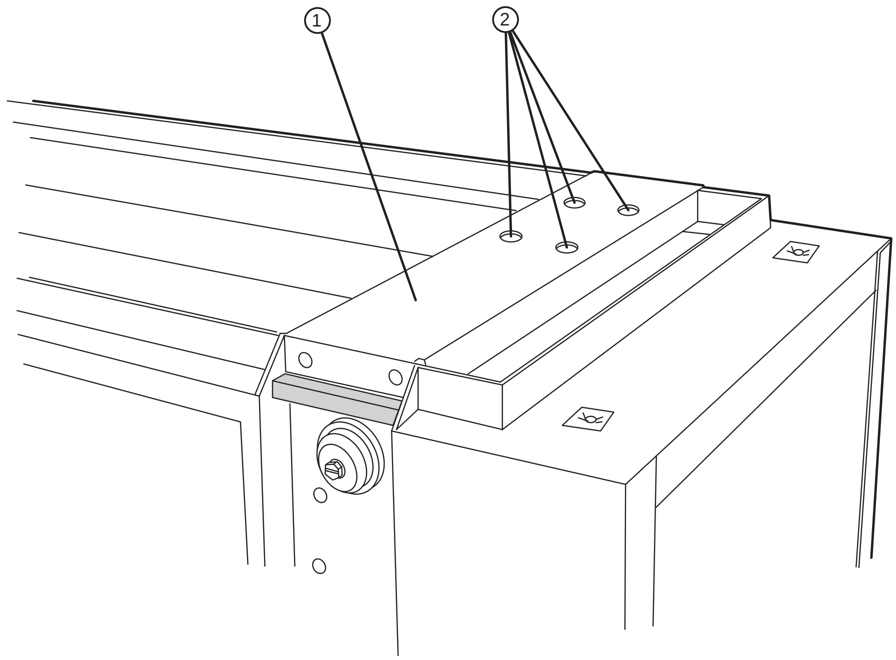


Figure 1-18 Newer buffer brace.

①–End brace. ②–Access holes to alignment screws.

4. Loosen the eight (8) adjustment screws, four (4) on each side, at the top of the rail bearing block. Refer to Figure 1-19.

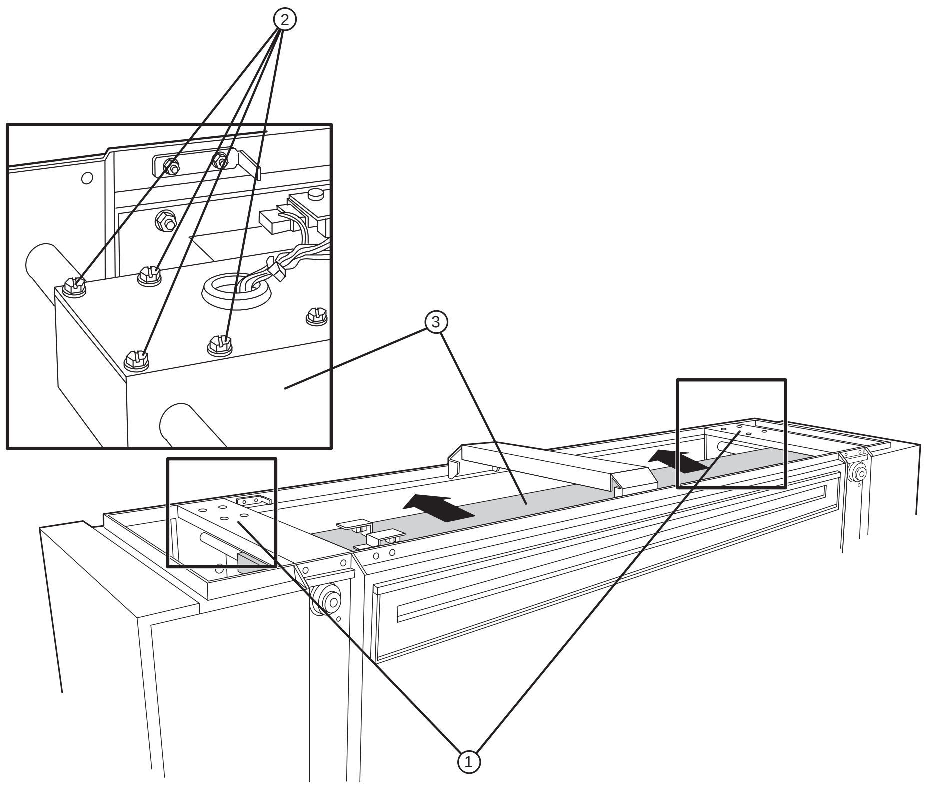


Figure 1-19 Buffer carriage adjustment screws.

①–Access holes in braces.
②–Adjustment screws, four on each end.
③–Buffer carriage (move to the front for adjustment).

5. Straighten the carriage so that it is flush with the frame and tighten the adjustment screws.

Chapter 2:
Buffer Component Removal/ Replacement

2.1 Introduction

This chapter describes the procedures for removing and replacing components in the Avantra 36/44 buffer.

Topics covered are:

- Buffer Home and Buffer Processor Sensors
- Buffer Purchase Sensor
- Buffer Carriage Drive Motor
- Buffer Roller Driver Motor
- Aligning the Buffer Carriage

2.2 Buffer Home and Buffer Processor Sensors

The following describes how to remove and replace the home and/or buffer processor sensors.

Tools Required: 1/4" open end wrench

Remove:

1. Remove the top cover from the buffer.
2. Disconnect the connector(s) from the sensor(s). Refer to Figure 2-1 for identification.
3. Remove the 1/4" hex nuts securing the sensors.

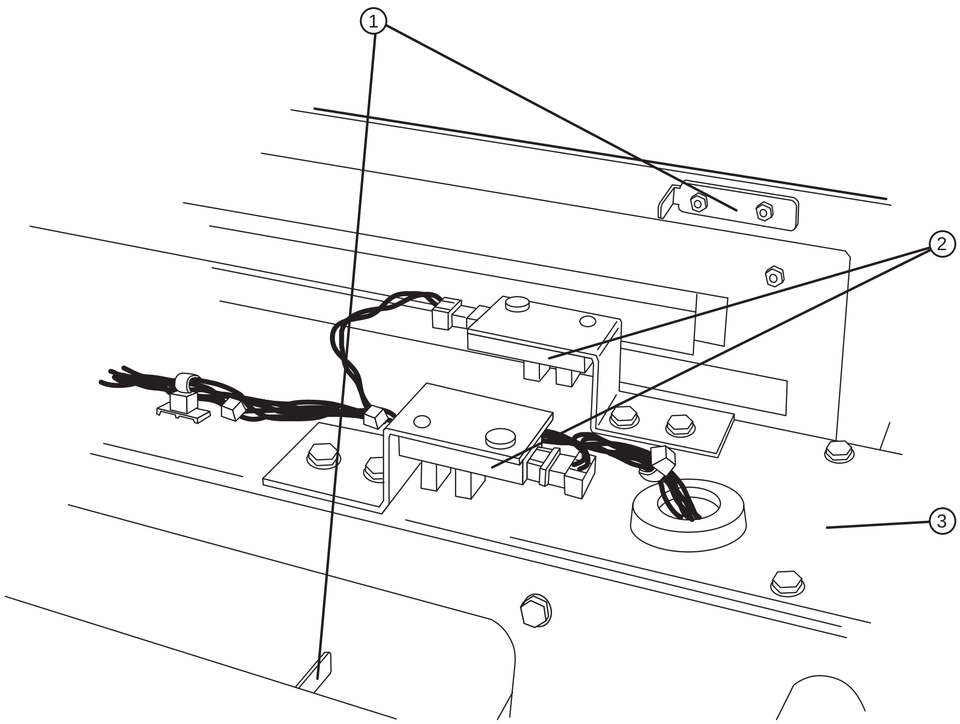


Figure 2-1 Buffer sensors and flags.

①–Sensor flags.
②–Home sensor (bottom) and buffer processor sensor (top) with connectors.
③–Buffer carriage.

Replace:

1. Reverse the procedures above.

CAUTION: When replacing the sensors, make sure that the flags enter the sensors at the correct point. Refer to Figure 2-2.

2.3 Buffer Purchase Sensor

The following describes how to remove and replace the purchase sensor.

Tools Required: 1/4" open end wrench

Remove:

1. Remove the top cover from the buffer.
2. Disconnect the connector from the sensor. Refer to Figure 2-2.
3. Remove the two (2) 1/4" hex nuts securing the sensor.

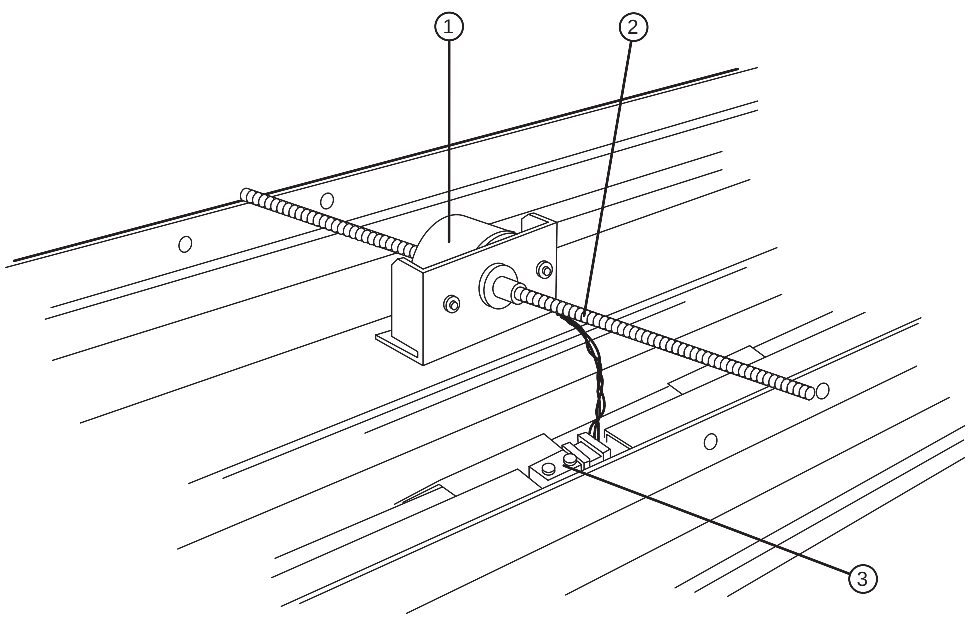


Figure 2-2 Buffer purchase sensor.

①–Carriage drive motor. ②–Lead screw. ③–Buffer purchase sensor.

Replace:

1. Reverse the procedures above.

2.4 Buffer Carriage Drive Motor

The following describes how to remove and replace the buffer carriage drive motor.

Tools Required: 1/4" open end wrench

Remove:

1. Remove the top cover from the buffer.
2. Remove the four (4) screws from the brace located in the top center of the buffer. Refer to Figure 2-3.

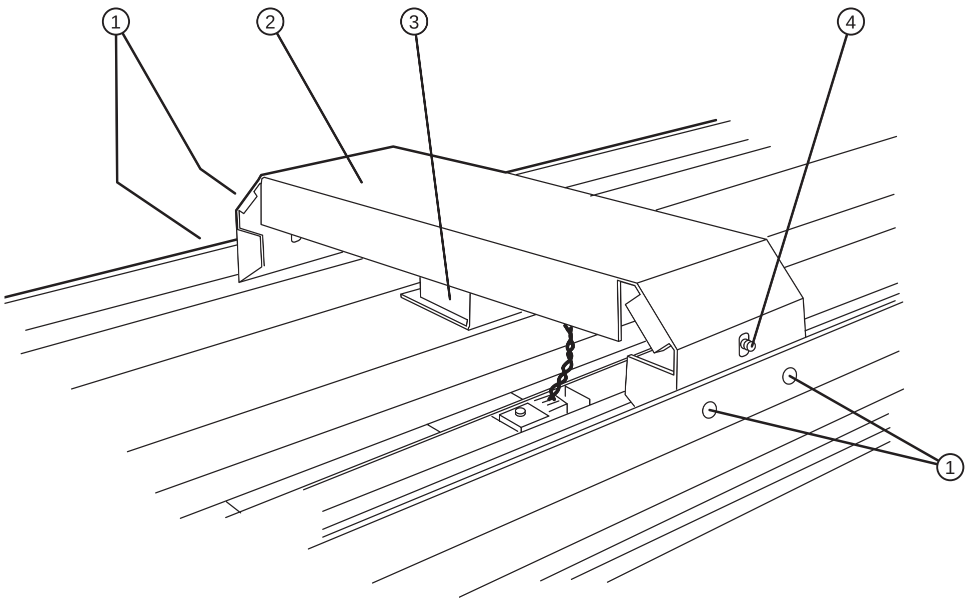


Figure 2-3 Carriage drive motor cover.

①–Four cover mounting screws. ②–Carriage drive motor cover.
③–Carriage drive motor. ④–Lead screw.

3. Remove the two (2) screws on the motor bracket. Refer to Figure 2-4.
4. Using a flathead screwdriver, disconnect the two (2) P-clips attached to the bracket. Refer to Figure 2-4.
5. Cut the tie wrap.
6. Remove the lead screw. Refer to Figure 2-4.

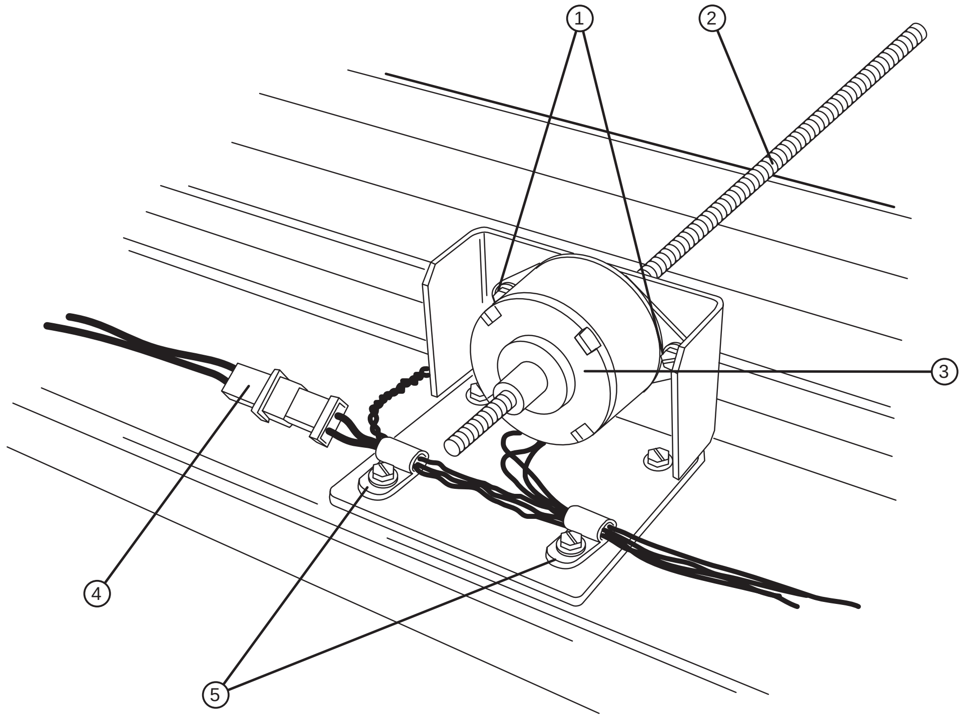


Figure 2-4 Buffer carriage drive motor.

①–Motor mounting screws. ②–Lead screw. ③–Buffer carriage drive motor.
④–Electrical connector. ⑤–Electrical wiring P-clips.

Replace:

1. Reverse the procedures above.

2.5 Buffer Roller Driver Motor

The following describes how to remove and replace the buffer roller driver motor.

Tools Required: 1/4" open end wrench

Remove:

1. Remove the top cover from the buffer.
2. Remove the top side panels.
3. Pull the two power plugs from the driver motor.

NOTE: Make note of the positioning of the two power plugs (red and brown) for purposes of replacement.

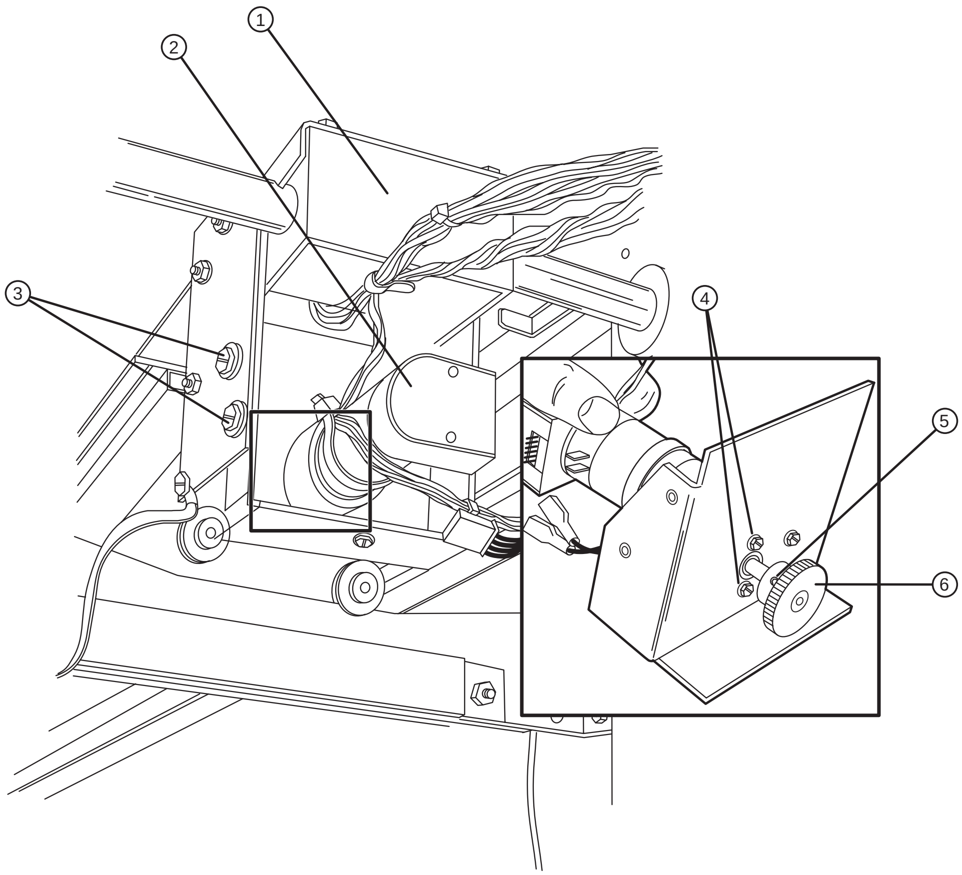


Figure 2-5 Buffer roller drive motor.

①–Buffer carriage. ②–Buffer roller drive motor.
③–Screws securing motor (two each side).
④–Three motor mounting screws. ⑤–Drive motor allen screw. ⑥–Drive gear.

4. Pull the encoder plug from the motor.
5. Remove the four (4) 1/4" screws, two (2) on each side, securing the motor. Refer to Figure 2-5.
6. Cut the tie wrap holding the wires to the motor.
7. Remove the three (3) 3/16" motor mounting screws from the back of the motor bracket. Refer to Figure 2-5.
8. Remove the set screw from the gear. Refer to Figure 2-5.

Replace:

1. Reverse the removal procedures above.
2. When re-attaching the motor gear, make sure that it matches up correctly with the roller gear. Using your fingers, spin the roller to check that the two gears mesh.

Appendix A

Spare Parts

Buffer

066486-005	Motor, servo
067338-001	Motor, stepper & shaft
066721-002	Sensor, buffer entrance
066271-002	Sensor, buffer purchase
066719-001	Sensor, buffer home/proc.
067326-001	Brake
C02395-001	Buffer top cover
C02328-001	Buffer top side cover
C02330-001	Buffer bottom side cover

Index

Section IV: On-line Processor

Chapter 1:
OLP Installation

1.1 Introduction

This chapter provides information for unpacking, assembling and installing the Avantra 36/44 On-Line Processor (OLP). Also described here are the electrical, plumbing, and other physical requirements.

This chapter contains:

- OLP Work Space Requirements
  - Space
  - Floor Load
  - Electrical
  - Operational
- OLP Unpacking Procedures
  - Tools Required for OLP Unpacking
  - OLP Inventory
  - Opening and Unpacking the Parts Crate
  - Unpacking and Preparing the OLP Engine
- Installation Procedures
  - Attaching the Legs and Feet
  - Connecting the Water Supply and Drainage
  - Connecting the Interface Cable
  - Connecting The Electrical Supply
  - Leveling and Attaching the OLP to the Buffer
  - Attaching the Panels and Covers

1.2 OLP Work Space Requirements

1.2.1 Space

OLP Dimensions

Width:	61" (154.94 cm)
Height:	54" (137.16 cm) with stand
Length:	66" (167.64 cm) excluding receiver tray 98" (248.92 cm) including receiver tray, roll mat. 120" (304.80 cm) including receiver tray, sheet mat

Buffer Dimensions

Width:	61" (24 cm)
Height:	54" (21.25 cm)
Length:	15" (6 cm)

Imagesetter Dimensions

Width:	73" (29 cm)
Height:	48" (19 cm)
Length:	35" (14 cm)

1.2.2 Floor Load

OLP Weight

Net Weight:	937 lbs. (2066 kg)
Oper. Wt:	1136 lbs. (2505 kg)

Buffer Weight

Weight:	200 lbs. (441 kg)

Imagesetter Weight

Weight:	1700 lbs. (3748 kg)

1.2.3 Electrical

OLP Electrical

Volts:	208-240 VAC
Hertz:	50/60 Hz
Phases:	1, 2 or 3 phases + (neutral) + ground
Load:	Maximum 7.0 kW

Imagesetter Electrical

Volts:	115/230
Amp:	5 / 2.5
Rec:	NEMA 5-20R
Power:	575 Watts

1.2.4 Operational

OLP Water Requirements

Water connection:	3/4" BSP (0.3-10 bar, max. temp. 110˚ /43˚C)
Drain:	5.3 US Gal. (3 x Ø25 mm, 3 x 20 L/min)
Water consumption:	0.5 US Gal. (0-2 L/min)

1.3 OLP Unpacking Procedures

1.3.1 Tools Required for OLP Unpacking

- Crowbar
- Claw hammer
- Strap cutters

1.3.2 OLP Inventory

The Avantra 36/44 OLP arrives in two crates. The top crate contains the OLP parts including:

1. Receiver basket (1 of 2)
2. Receiver basket (1 of 2)
3. Rear exit panel (bottom)
4. Middle top cover
5. Rear exit panel (top)
6. Rear top side panel
7. Rear top side panel
8. Front top Side panel (control)
9. Evaporation cover
10. Right lower door

11. Left lower door
12. Legs
13. Cover for entrance rack
14. Lower front cover for entrance rack (1 of 2)
15. Lower front cover for entrance rack (2 of 2)
16. Inner cover for entrance rack (under top cover)
17. Panel between imagesetter and OLP
18. Top cover (rear)
19. Chemistry trolley
20. Drip tray (1 of 2)
21. Rack drip tray
22. Filter parts, chemical bottle covers, etc
23. Fixer rack
24. Developer rack
25. Wash rack
26. Developer/fixer crossover guide
27. Fixer/wash crossover guide
28. Anti-oxidation cover (1 of 2)
29. Anti-oxidation cove (2 of 2)
30. Stabilizer (cross-member for legs [#12])

The bottom crate contains the OLP engine. Open the parts crate first.

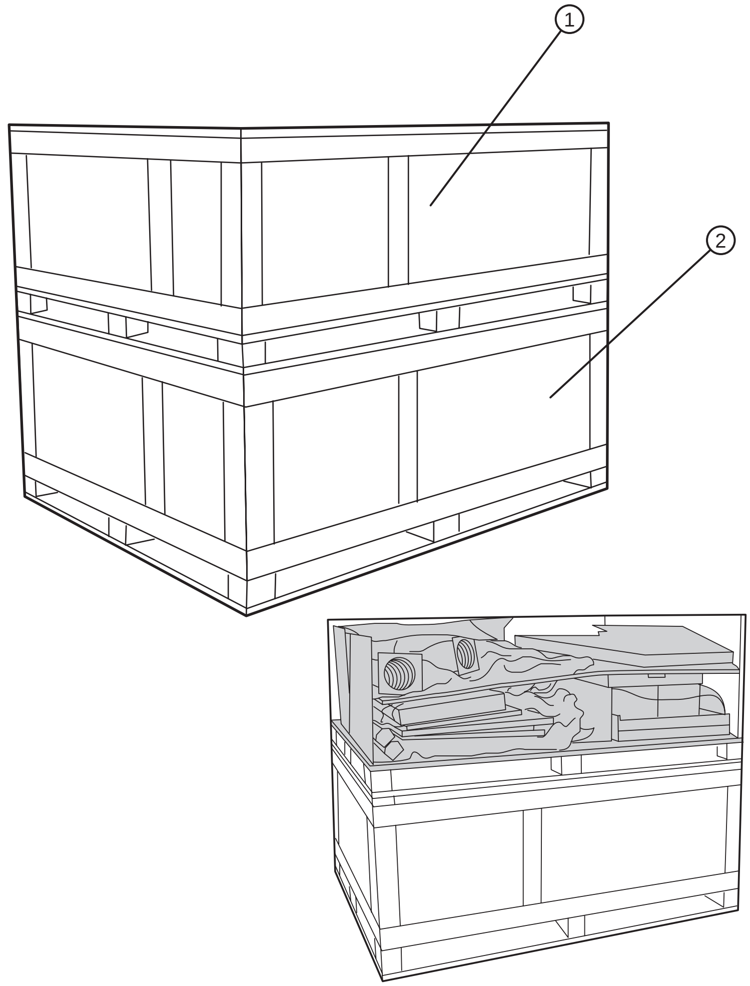


Figure 1-1 OLP shipping crates.

①–Parts crate (open first). ②–Engine crate.

1.3.3 Opening and Unpacking the Parts Crate

Steps:

1. Take the pallet with both crates to the site where the OLP is to be installed. If this is not possible, unpack, remove, and transport the parts according to the followings steps.
2. Using strap cutters, cut the straps from around the wooden crate.
3. Using a crowbar and claw hammer, open the crate.
4. As the parts are removed, check them against the inventory list at the beginning of this section and in Figure 1-2.

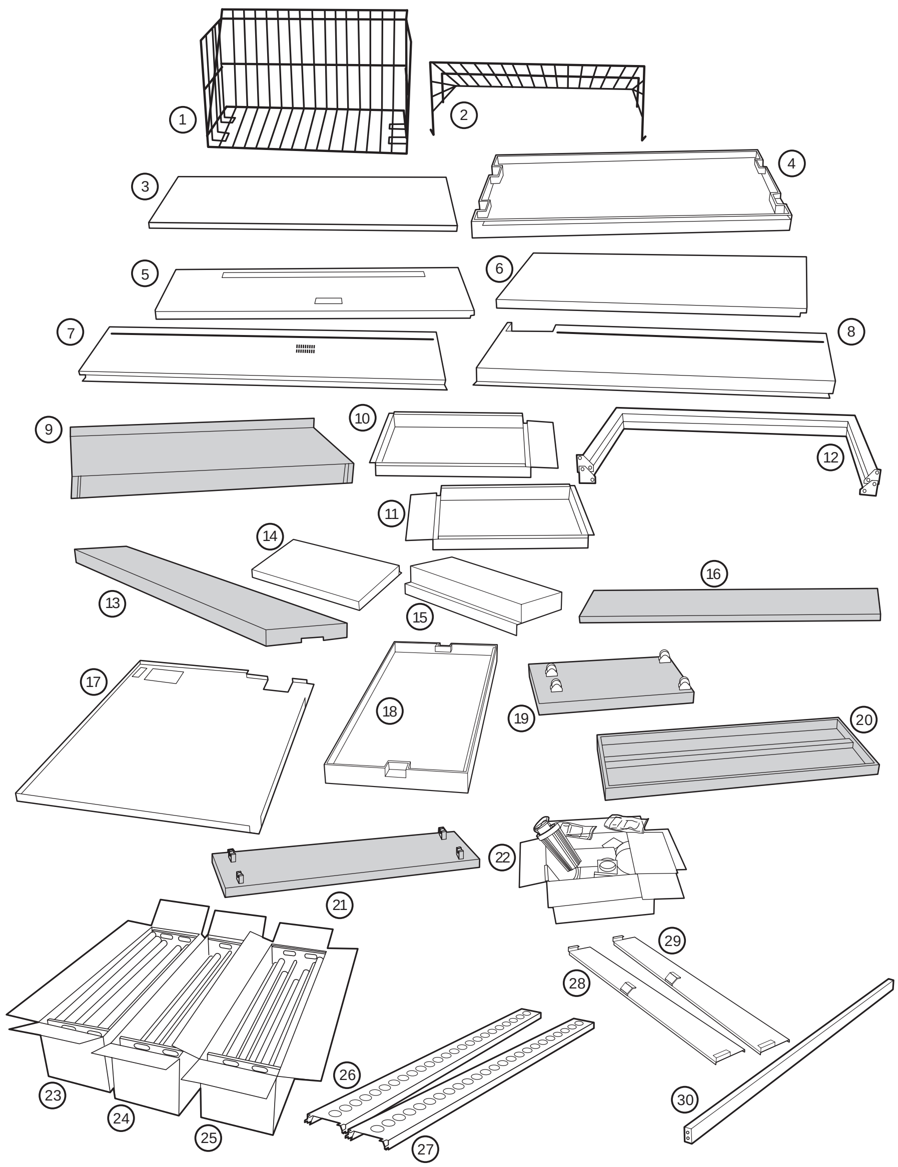


Figure 1-2 OLP parts inventory.

①–②–Receiver basket (two parts). ③–Rear exit panel (bottom). ④–Middle top cover. ⑤–rear exit panel (top). ⑥–rear lower panel. ⑦–rear top side panel. ⑧–Front top side panel (control). ⑨–Evaporation cover. ⑩–Right lower door. 11–Left lower door. 12–Legs. 13–Forward top cover. 14– 15–Lower front covers for entrance rack (2). 16–Inner cover for entrance rack (under forward top cover). 17–Front panel. 18–Rear top cover. 19–Chemistry trolley. 20–Drip tray. 21–Rack drip tray. 22–Filter parts, chemical bottle covers, etc. 23–Developer rack. 24–Fixer rack. 25–Wash rack. 26–Developer/fixer crossover guide. 27–Fixer/wash crossover guide. 28–Developer anti-oxidation cover. 29–Fixer anti-oxidation cover. 30–Leg cross-member (stabilizing brace).

CAUTION: The rack assemblies and legs are heavy and should be transported through mechanical means.

5. Load the three (3) cardboard boxes containing the racks onto a separate pallet. Cover the boxes with cardboard.

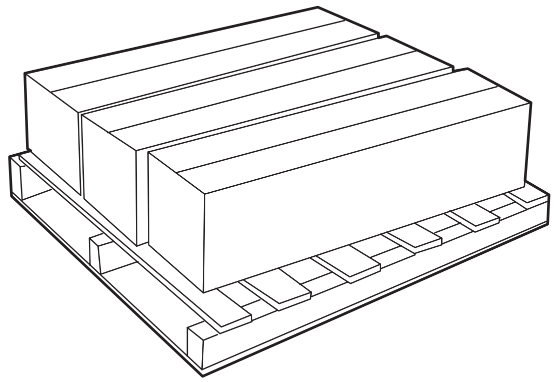


Figure 1-3 Rack boxes.

6. Load the legs on top of the cardboard and with a forklift take the pallet to the installation site.

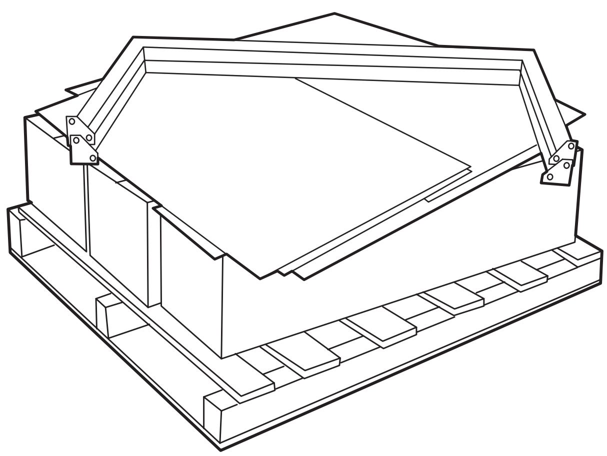


Figure 1-4 OLP legs.

1.3.4 Unpacking and Preparing the OLP Engine

1. Take the pallet with the engine crate to the site where the OLP is to be installed. If this is not possible, unpack, remove, and transport the OLP engine according to the followings steps.
2. Using strap cutters, cut the straps from around the wooden crate.
3. Using a crowbar and claw hammer, open the crate.
4. Remove the cardboard cover and the plastic cover.

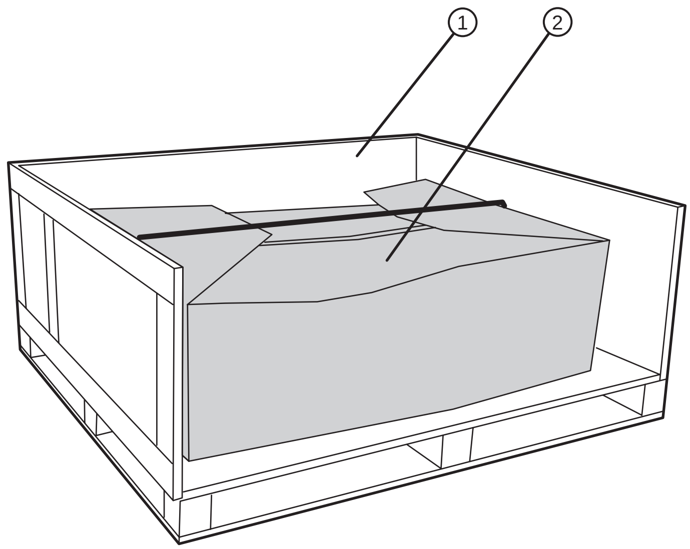


Figure 1-5 Engine crate.

①–Bottom shipping crate. ②–Engine packing.

5. At the front of the engine, remove the roller and bearing on top. Refer to Figure 1-6.
6. At the rear of the engine tape the door securely to the frame. Refer to Figure 1-6.

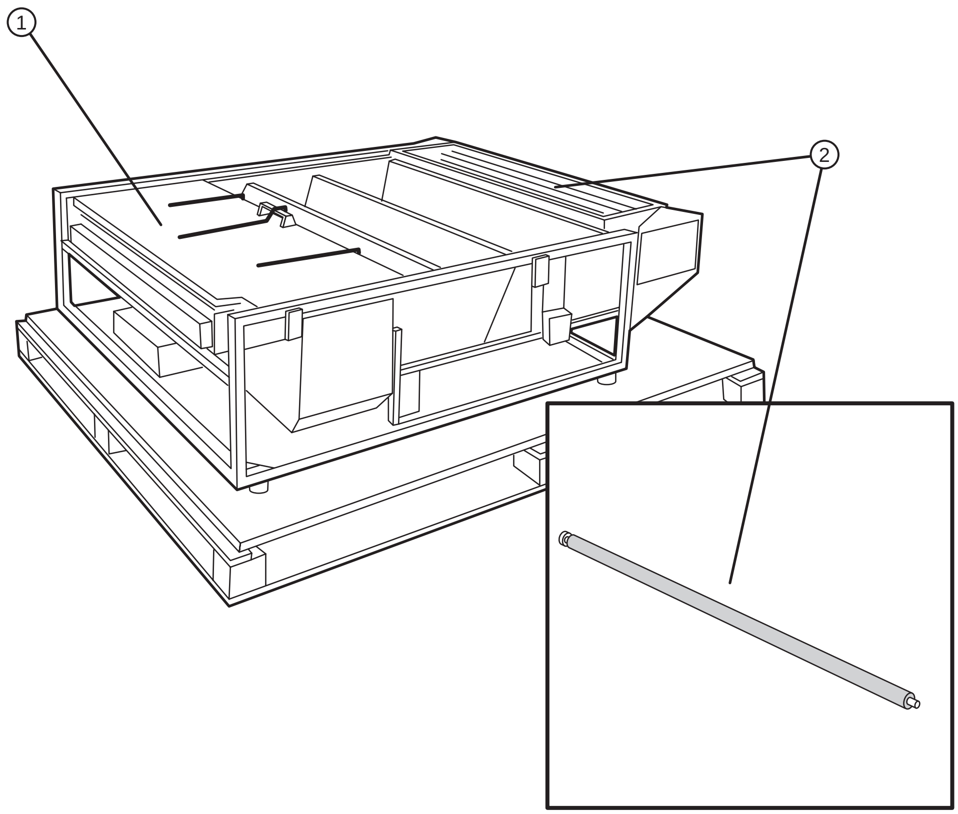


Figure 1-6 Engine lid and roller.

①–Lid (tape before moving engine). ②–Roller (remove before moving).

7. Using a phillips head screwdriver, remove the two (2) open-door sensors located on the side of the engine and tape them to the inside of the frame. Refer to Figure 1-7.
8. Using a phillips head screwdriver, remove the chimney (with fan attached) and tape them to the inside of the frame. Refer to Figure 1-7.

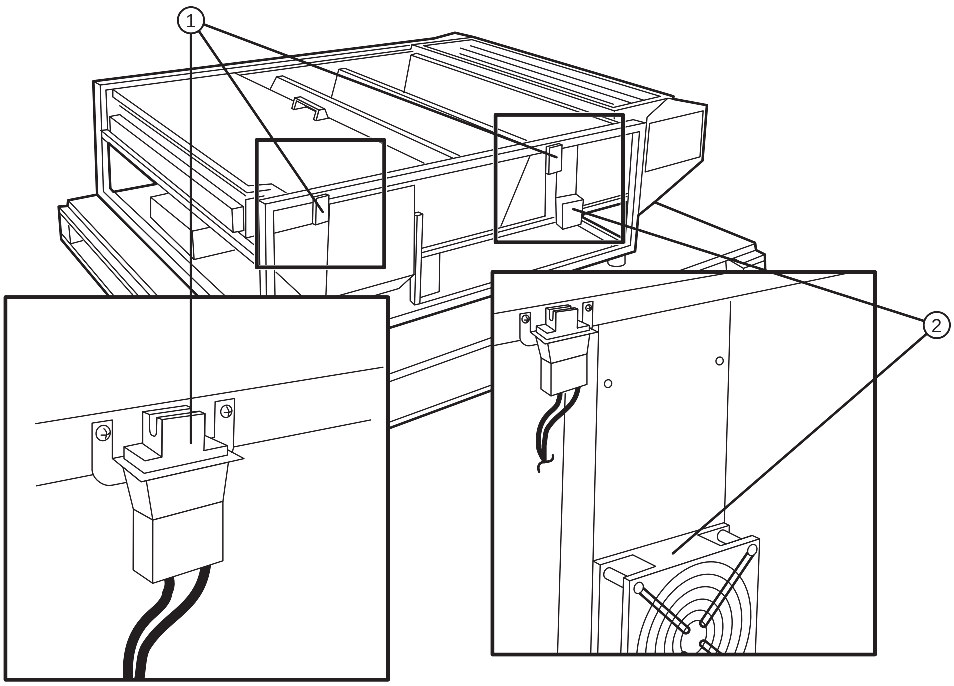


Figure 1-7 Open-door sensors and fan.

①–Sensor (1 of 2) with screws. ②–Fan attached to chimney.

9. Using an open ended wrench, remove the four (4) shipping standoffs securing the OLP engine frame to the bottom of the crate.

   The standoffs are located at the four corners of the frame. Refer to Figure 1-8.

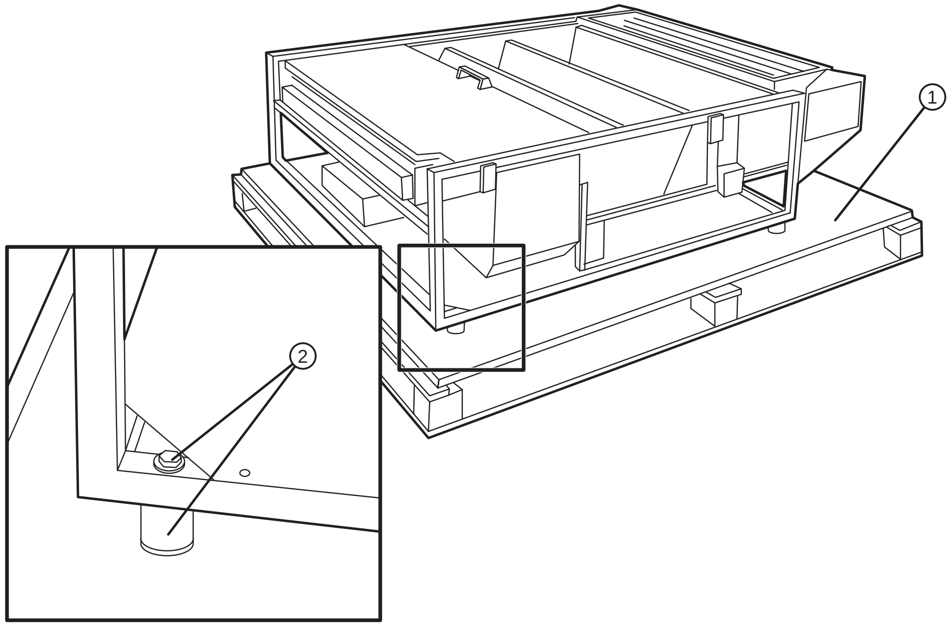


Figure 1-8 Standoffs.

①–Bottom of crate. ②–Shipping standoff (1 of 4).

10. Position two (2) dollies against the bottom of the crate. Block the wheels then tip the OLP engine onto its side and lift onto the dollies. Refer to Figure 1-9.

WARNING: Always use proper back support belts when lifting heavy weights (see Figure 1-10).

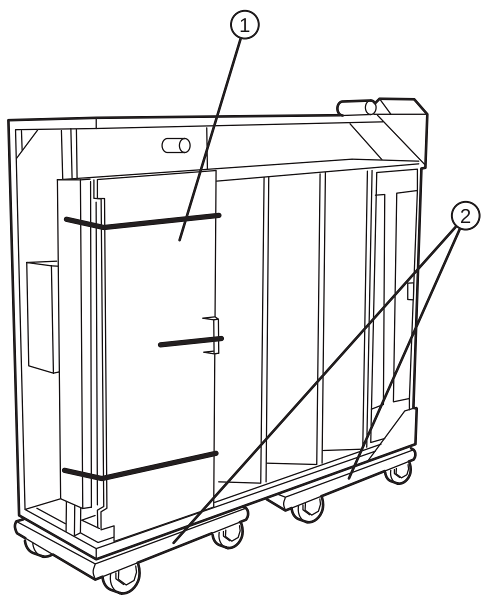


Figure 1-9 Engine assembly loaded on dollies.

①–Engine assembly. ②–Transport dollies.

11. Bring the engine to the installation site.

1.4 Installation Procedures

1.5 Tools and Equipment Required for Installation

The following tools and equipment are required to perform installation, set-up, and checkout of the processor.

- Digital Voltmeter (DVM)
- Phillips and slotted-head screwdrivers
- Level
- Darkroom thermometer (long barrel, non-mercury type)
- Adjustable open-end wrench
- 500 ml graduate

1.5.1 Attaching the Legs and Feet

NOTE: Do not remove the engine from the dollies until the legs, leveler feet (two at the top) and stabilizer bar are attached to the frame.

1. Using a hex driver, attach the two (2) legs to the bottom of the OLP engine frame. Refer to Figure 1-10 and Figure 1-11.

   Attach the lower bolts first, followed by the upper ones. This helps make bolt alignment easier.

2. Attach the stabilizer bar to the bottom set of legs on the left side. Refer to Figure 1-10 and Figure 1-11.

3. Attach the leveler feet to the top two (2) legs only. Refer to Figure 1-10 and Figure 1-11.

WARNING: Use two people for tipping the engine (next step).

4. Tip the OLP engine right side up. Rest the legs on a block and install the remaining two (2) leveler feet. Refer to Figure 1-10 and Figure 1-11.

WARNING: Always use proper back support belts when lifting heavy weights (see Figure 1-10).

5. Reattach the sensors to the side of the frame (see Figure 1-7).
6. Reattach the chimney with fan to the side of the frame (see Figure 1-7).

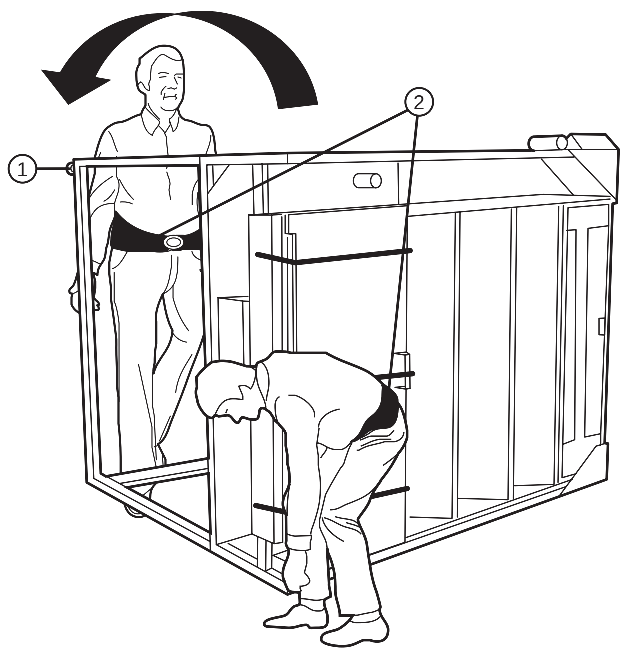


Figure 1-10 Tipping the OLP engine.

①–Front leveler feet (attach first before tipping). ②–Proper back support belts.

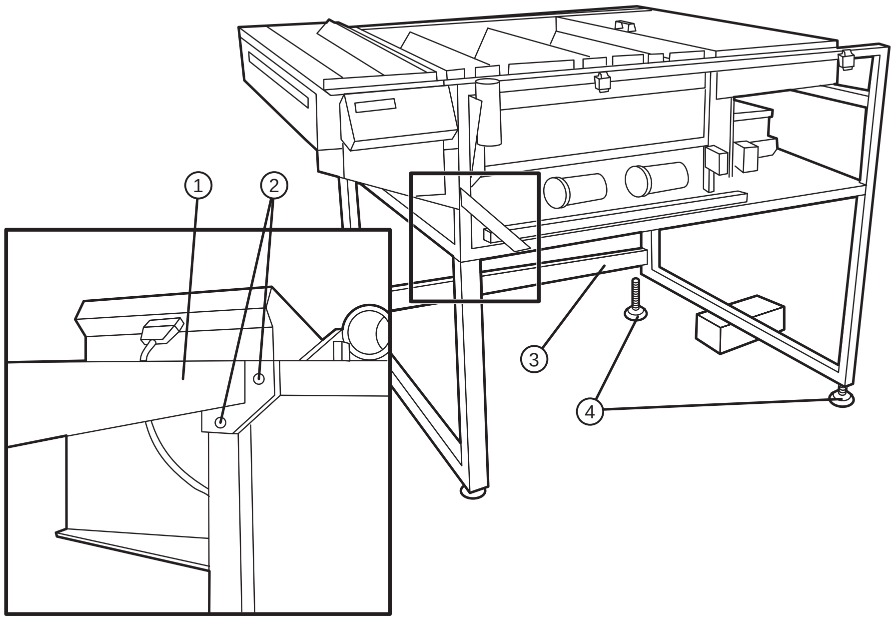


Figure 1-11 Assembling the legs, brace and leveler feet.

①–Support leg. ②–Two hex screws. ③–Stabilizer brace.
④–Rear leveler feet (block legs and attach these last).

1.5.2 Connecting the Water Supply and Drainage

CAUTION: To ensure sufficient rinsing of the media after developing and fixing, the processor must be connected to temperate wash water. The water temperature must not exceed 110°F (43°C), and the water pressure must be 0.3 bar to 10 bar. Filtration rate of the filter cartridge should be at least 25 microns.

CAUTION: The temperature difference between the fixer and the water in the wash section must not exceed 27°F (15°C). Exceeding this temperature may cause stress of material and bending of the partition between the fixer and wash sections.

Water Connection	3/4" BSP (0.3-10 bar, max. temp. 43°C/110°F)
Drain	3 x Ø25 mm, 3 x 20 L/min. (5.3 US Gal.)
Water Consumption	0-2 L/min. (1/2 US Gal.)
Tank Capacity, developer	14.3 L (3.8 US Gal.)
Tank Capacity, fixer	13 L (3.5 US Gal.)
Tank Capacity, water	11.5 L (3 US Gal.)
Temperature Range, developer	23°-43°C (74°-110°F)
Temperature Range, fixer	23°-43°C (74°-110°F)
Temperature Settings, dryer	30°-60°C (86°-140°F)

Steps for Connecting Water Supply/Drainage:

1. The incoming water hose has a factory mounted solenoid valve at the inlet end. This solenoid valve should be connected to the main water supply.

   The valve has a built-in flow regulator, limiting the flow rate to a maximum of 2 L/min. (.5 Gal/min.).

   If required, connect the adapter supplied with the system to convert the 3/4" pipe thread to 3/4" hose thread.

   NOTE: When using a wash recirculator, bypass the 3/4" water solenoid.

   WARNING: Install drain configurations to comply with federal, state, and local environmental and plumbing codes and regulations.

2. Cut the drain hoses to the appropriate length and connect to the drain fittings on the bottom of each tank. Using the stainless steel clamps provided, secure the hoses to the fittings.

   Securing the hoses prevents leakage.

Installing the Interface Cable

1. Remove the back and rear side panels of the OLP (if they are not already off).
2. Connect the interface cable at X402.
3. Route the new cable in place through the processor.
4. Route the cable into the imagesetter electronics compartment and fasten the "P" clamp to the bottom modem mount bracket screw closest to the door as shown in Figure 1-12.

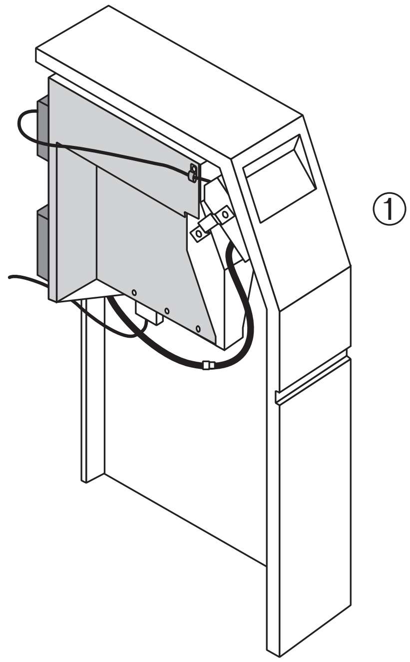


Figure 1-12 Interface cable.

①–Interface cable.

5. Connect the RJ45 satin cable to the closest port in the OCP.
6. Connect the two cables together, using the RJ45 to DB9 adapter.
7. Check that the cable does not interfere with other components when closing the cabinet doors.

1.5.3 Connecting The Electrical Supply

CAUTION: Electrical connections and sources must comply with local electrical codes.

Power Supply	208-240 VAC, 50/60 Hz
	1, 2, or 3 phases + (neutral) + ground
	(see electrical connection)
Load	Max. 7.0 kW (operational mode)
	0.4 kW (stand-by mode)

Before connecting the processor to the local electrical power source, determine whether the unit requires any internal wiring modifications. Processor input wiring connections are located in the electronics compartment beneath the dryer section.

Power Transformer Primary Tap Connections

The power transformer, located near the power triacs, has three alternate primary tap connections to accomodate variations in the ac supply voltage. Refer to Figure 1-13.

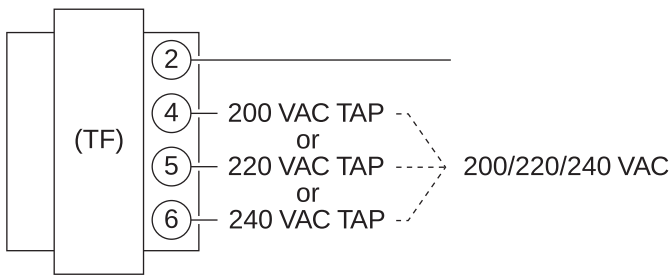


Figure 1-13 Power transformer primary tap connections.

- If the supply voltage, as measured between L1 and L2, is higher than 240VAC, disconnect the wire from the #5 position (220VAC) and reconnect it to the #6 position (240VAC).
- If the supply voltage is between 220 and 240VAC, leave the connection as is (#5, 220VAC).
- If the supply voltage measures below 220VAC, disconnect the wire from the #5 position (220VAC) and reconnect it to the #4 position (200VAC).

Operation on 400/415V 3N~50/60HZ

The processor is wired at the factory for operation on 400/415V 3N~50/60Hz, plus ground line. See the top connection diagram in Figure 1-14 below. If this is the available power source, then the processor requires no wiring modifications.

Rewiring for other Operations

NOTE: If the OLP is being installed in the U.S., the OLP will need to be rewired.

The unit ships wired for 400/415V 3N~50/60Hz. To modify the processor wiring remove the rear panel to gain access to the electrical compartment. Refer to the diagrams in Figure 1-14 for the following Wiring Configurations:

- 400/415V 2N~50/60Hz
- 230-240V N~50/60Hz
- 208-240V three phase~50/60Hz
- 208-240V single phase~50/60Hz

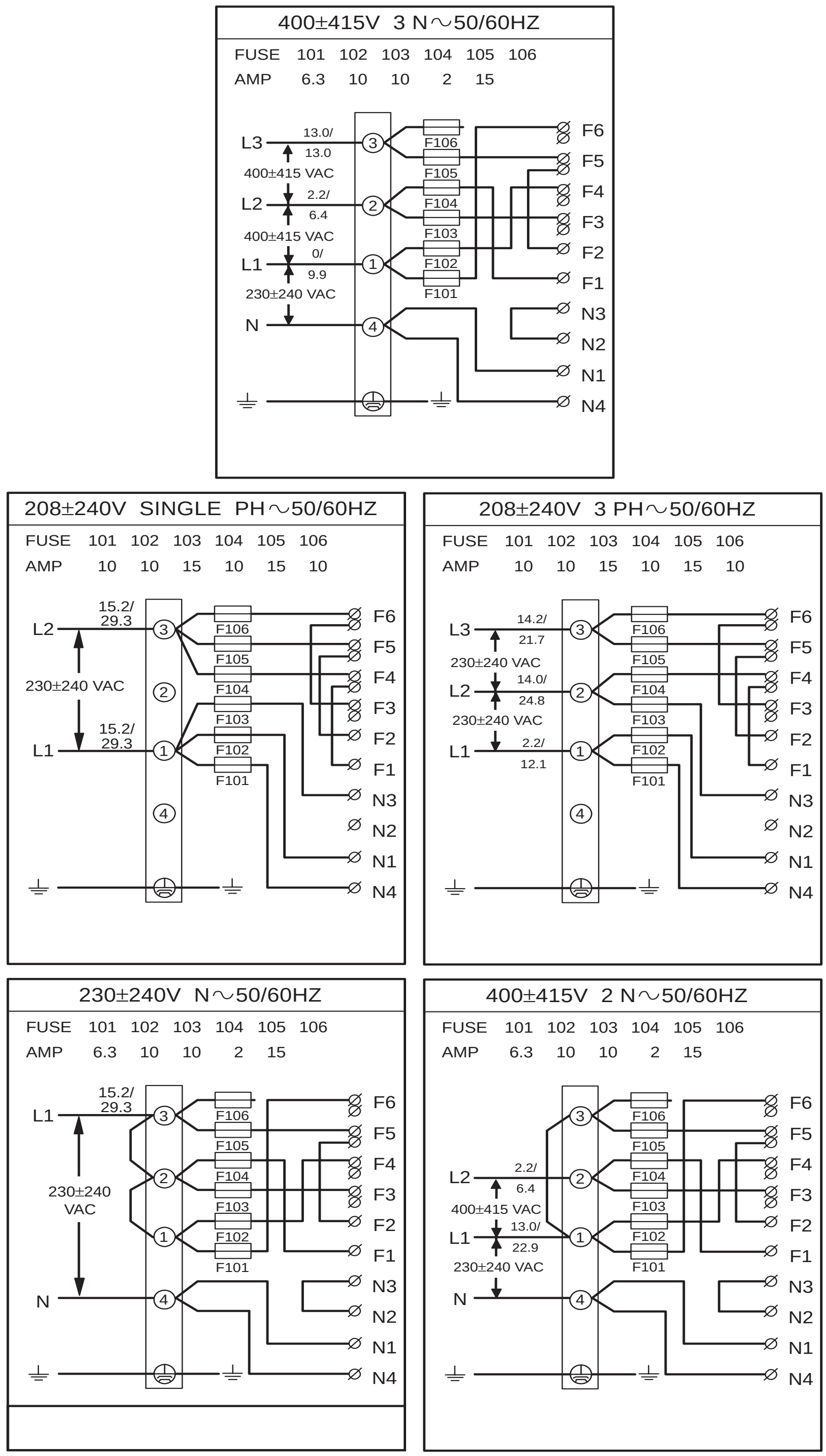


Figure 1-14 Rewiring for different operations.

1.5.4 Leveling and Attaching the OLP to the Buffer

1. For side-to-side leveling, use a spirit level across the top of the divider walls of the developer and fixer tank.
2. For front to back leveling, use the spirit level along the top of the tank side walls.
3. Attach the front panel. Refer to Figure 1-15.

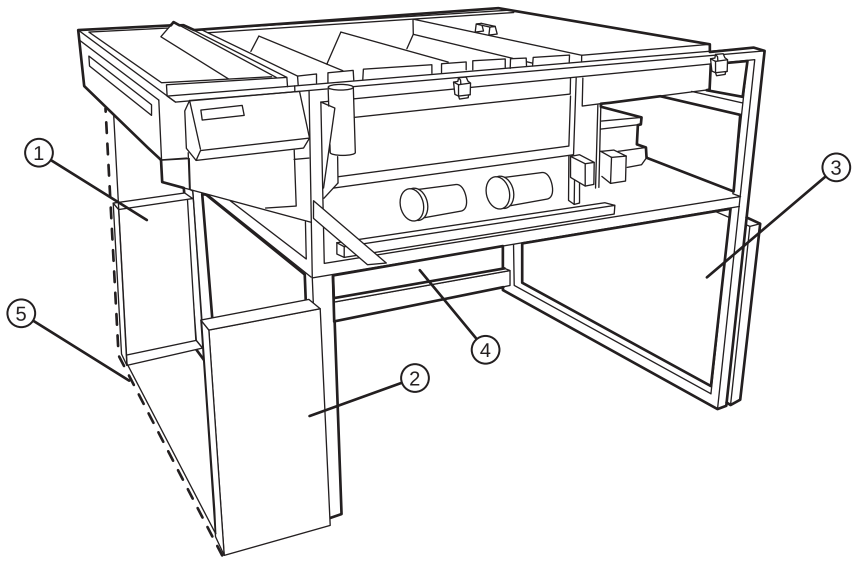


Figure 1-15 Attaching covers and panels to the OLP.

①–Front left vent cover. ②– Front right vent cover. ③–Lower rear panel. ④–Left side panel. ⑤–Front panel.

4. Remove the block of wood and bolt (shipping hardware) from the entrance rack assembly at the front of the OLP.

5. Remove the upper entry platen from the entrance rack. Refer to Figure 1-16.
6. Roll the imagesetter with the buffer attached to the OLP. The buffer and OLP must interface as shown in Figure 1-16.

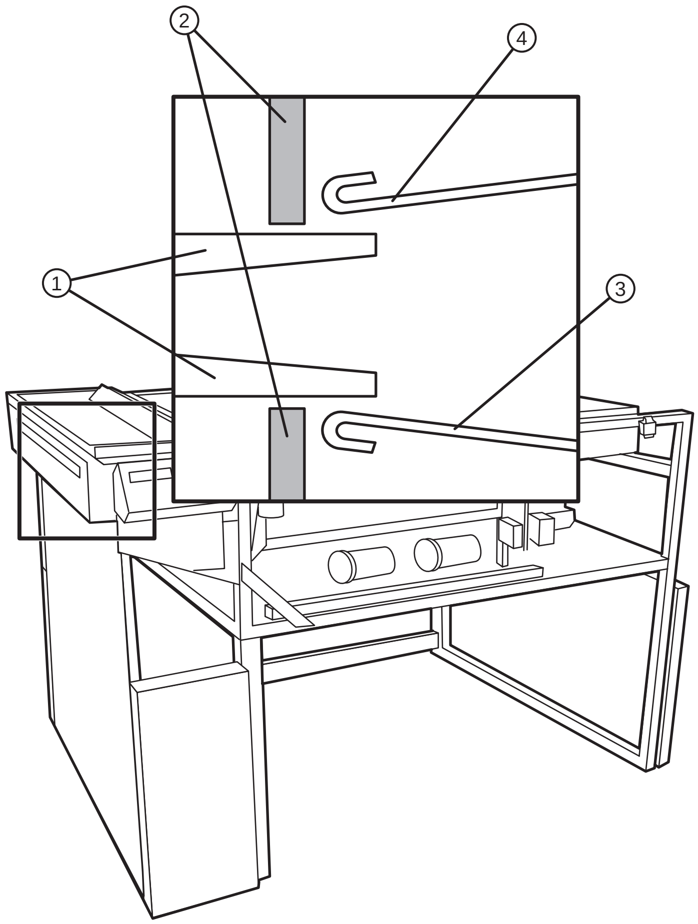


Figure 1-16 The buffer and OLP interface.

①–Buffer interface. ②– OLP front plate. ③–Lower platen of entry rack.
④–Upper platen (removed during the interface alignment).

7. If the interface is off, follow these steps. With the imagesetter/buffer and OLP in close proximity, measure the distance from the floor to the buffer exit platen and the floor to the OLP entrance platen. Refer to Figure 1-17.

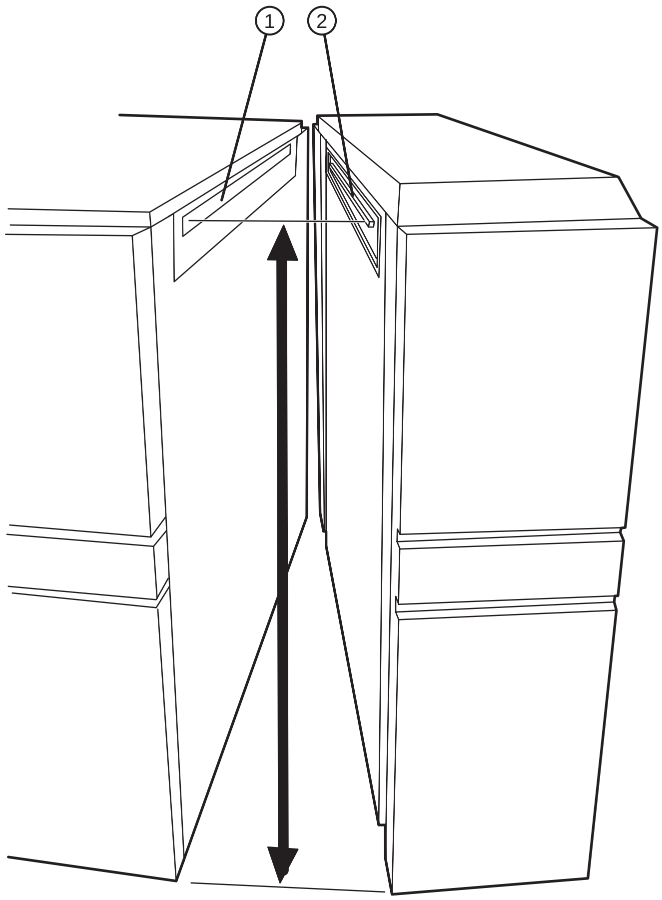


Figure 1-17 Measuring from the floor to the platen for correct OLP To Buffer Alignment.

①–OLP entrance platen. ②–Buffer exit platen.

8. Raise or lower the OLP and/or buffer leveling feet at the bottom until the platens align. Refer to Figure 1-18.
9. Push the buffer (attached to the imagesetter) flush against the OLP.
10. Lower the feet at the front of the imagesetter to hold the imagesetter/buffer assembly tightly against the OLP.

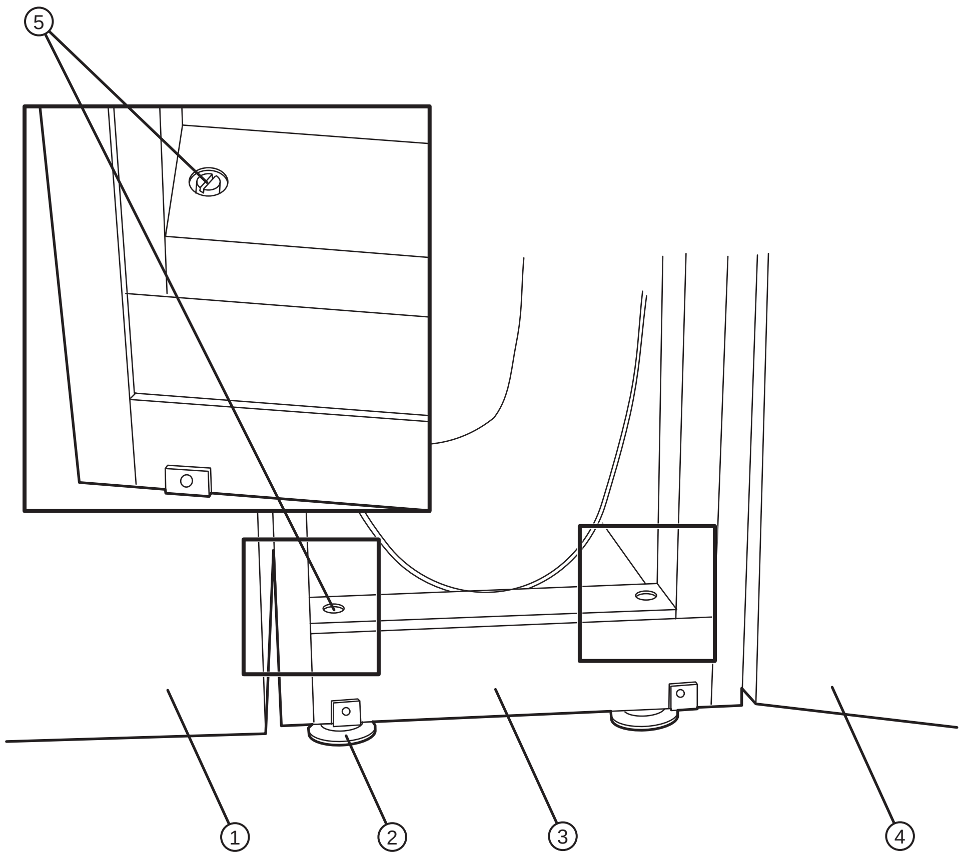


Figure 1-18 Adjusting the buffer legs for buffer to OLP alignment.

①–OLP ②– Adjustable leg. ③–Buffer. ④–Imagesetter
⑤–Leg adjustment screw.

1.5.5 Attaching the Panels and Covers

1. Using phillips head screws and washers, attach the side covers (one [1] on each side) to the front of the OLP engine. Refer to Figure 1-19.
2. Attach the lower rear panel. Refer to Figure 1-19.
3. Attach the left side panel (bottom). Refer to Figure 1-19.

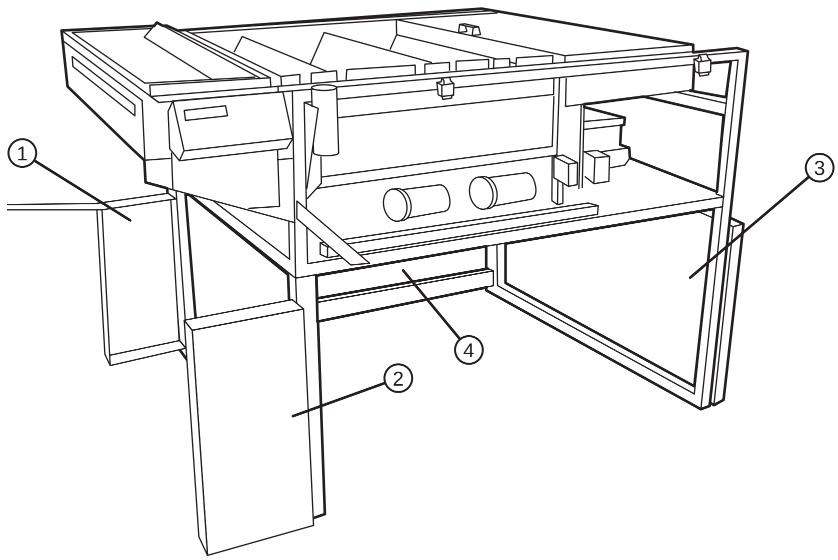


Figure 1-19 Front, rear and side panels.

①–Front left side cover. ②–Front right side cover.
③–Lower rear panel. ④–Left side panel (bottom).

4. Attach the developer filter on the left side.

5. Attach the top side panel to the left side of the frame. Refer to Figure 1-20.
6. Attach the striker plate to the right side of the frame. Refer to Figure 1-20.
7. Attach the left lower door (hinged) to the right side of the frame. Refer to Figure 1-20.
8. Attach the right lower door (hinged) to the right side of the frame. Refer to Figure 1-20.

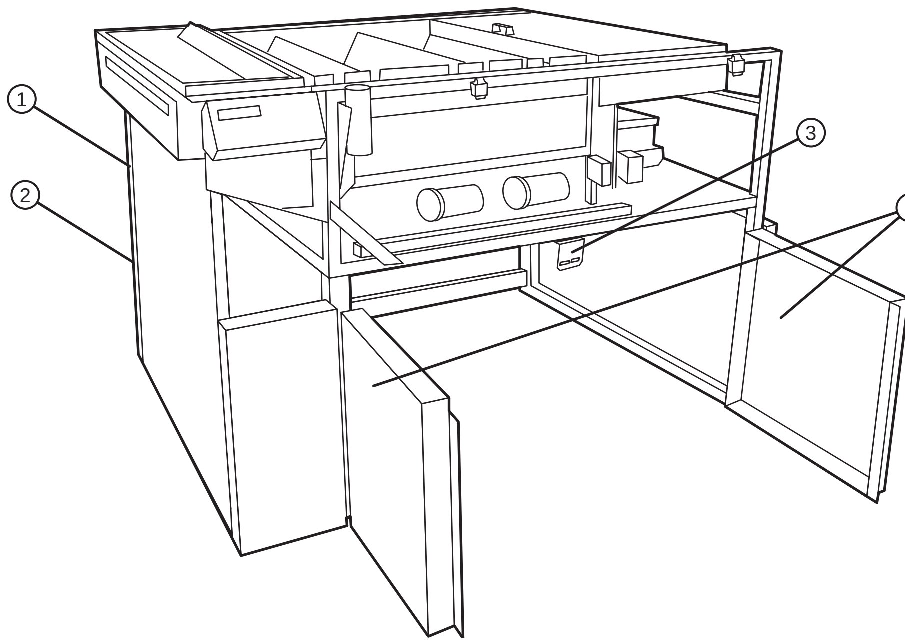


Figure 1-20 Side covers, striker plate, doors for right side.

①–Top left side panel. ②–Bottom left side panel.
③–Striker plate. ④–Right side hinged doors (2).

9. Remove the tape from the door at the top of the engine (see Figure 1-6). Remove the foam from the dryer section.

10. Place the drip tray, trolley and fluid containers under the OLP. Refer to Figure 1-21.

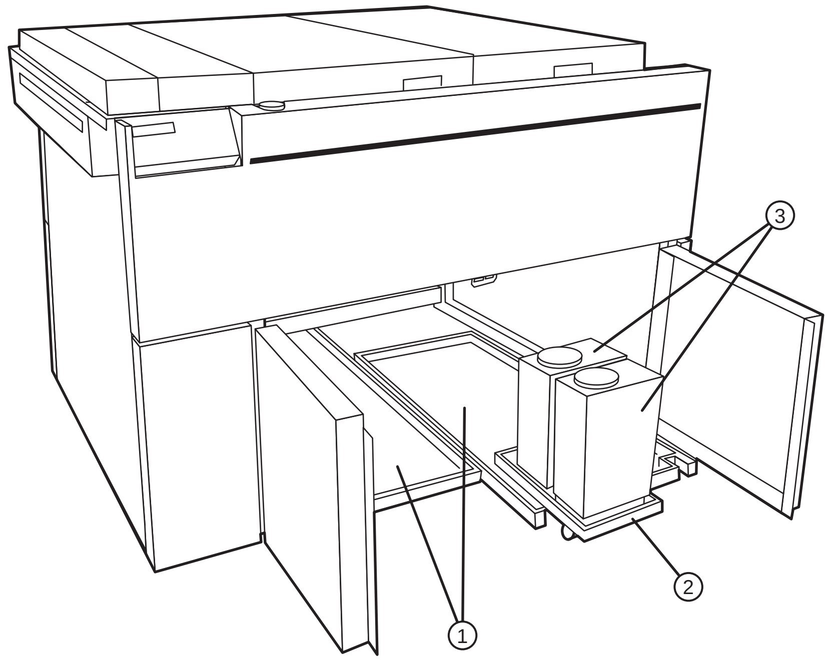


Figure 1-21 Placing the drip tray, chemistry trolley and fluid containers.

①–Drip tray. ②–Chemistry trolley. ③–Fluid containers.

11. Underneath the engine, cut the tie wraps for the:
    - red (developer) hose
    - blue (fixer) hose
    - grey (water supply) hose
    - black and white wires (replenishment sensors)

12. Inspect each of the three roller rack assemblies. Check that the gears mesh properly and operate smoothly when turned manually.

CAUTION: Installing the racks (in the next step) requires two people unless the crane is installed. If two people are not available at this step in the installation, see *The Avantra 36/44 Crane Service Manual*, Chapter 1, Installing the Crane.

13. Put the racks in in the following order:

    a. developer

    b. fixer

    c. wash

    Refer to Figure 1-22.

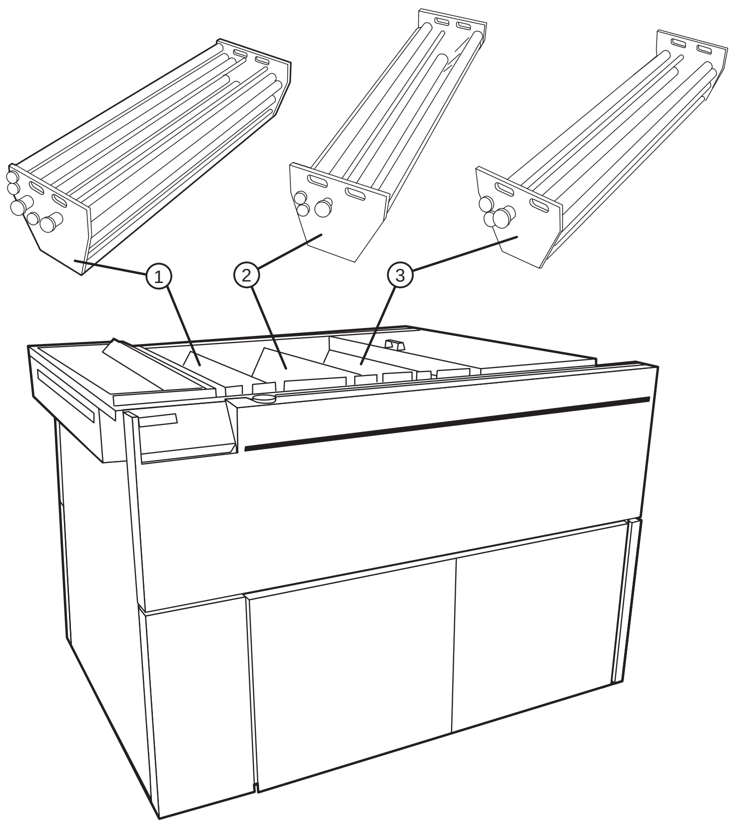


Figure 1-22 Racks.

①–Developer. ②–Fixer. ③–Wash.

4. Replace the roller and bearing at the top front of the engine. Refer to Figure 1-23.
5. Check for a proper mesh between the main drive worm gears and the corresponding gears on each rack.

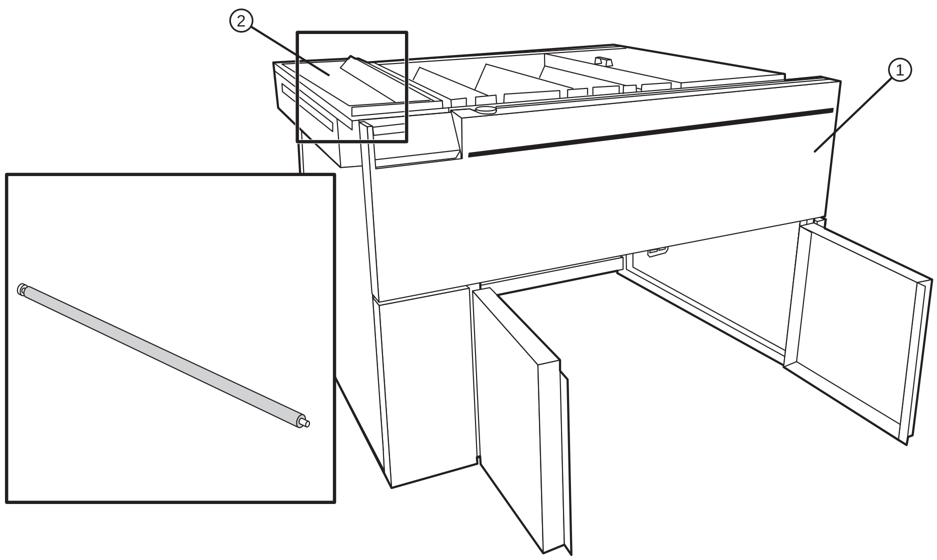


Figure 1-23 Replacing the roller.

①–Right side cover. ②–Roller (replace).

6. Plug in the power cord at the rear of the engine.
7. Attach the back panel.

8. Attach the basket (2 parts) at the rear. Refer to Figure 1-24.

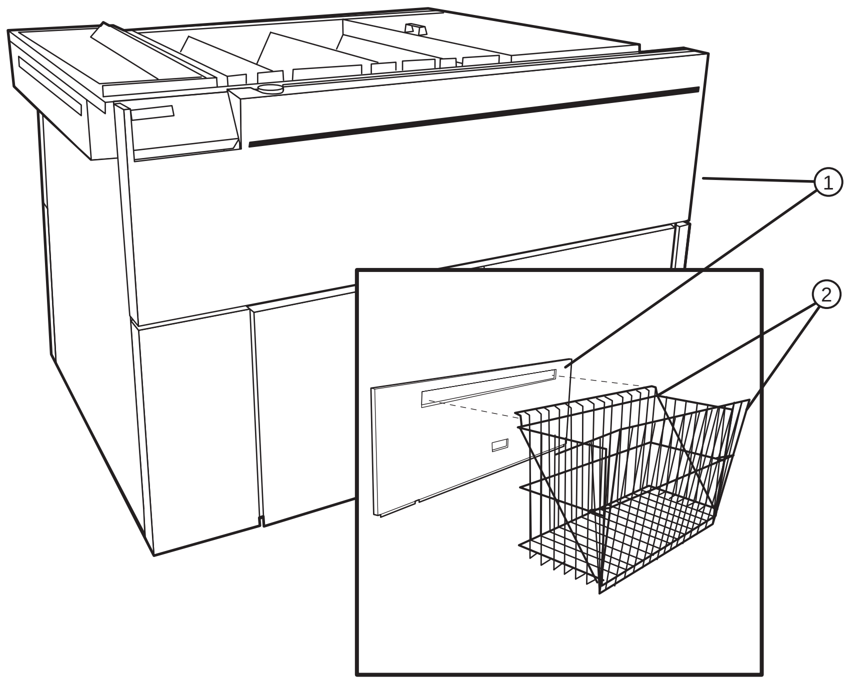


Figure 1-24 Rear panel and media basket.

①–Rear panel. ②–Media basket assembly.

26. Put in the two (2) crossovers.

27. Install the filter housing for the developer *without* the cartridge installed. Rinse each tank thoroughly with water. Put in the color coded overflow tubes in each tank, as follows:
    - Red for developer
    - Blue for fixer
    - Grey for water

    Refer to Figure 1-25.

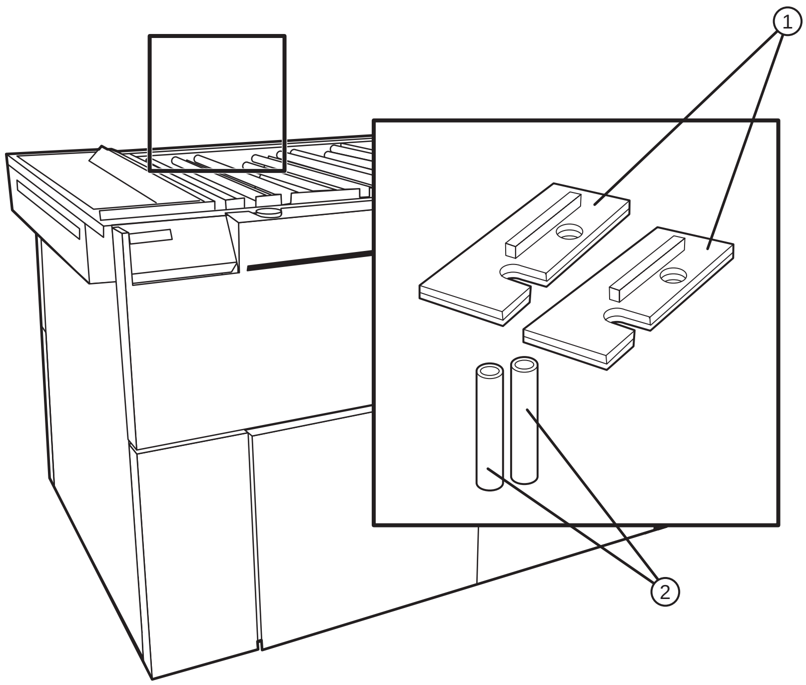


Figure 1-25 Overflow supports and tubes.

①–Overflow supports. ②–Overflow tubes.

28. Check that the overflow tubes are secure by tightening with a T-wrench.
29. Re-tighten all hose clamps.
30. Check that the valve at the bottom of the developer filter housing is closed and the valves leading to and from the filter housing are open.
31. Fill each tank with water, up to overflow, and replace the rack covers.

32. Partially fill the replenishment containers with water and insert the replenishment hoses and level sensors.
33. Set the main power switch to on.
34. Turn on the main water supply valve.
35. Turn on the processor.
36. Check that the circulation pumps operate and that all air is expelled from the pumps and hoses.

CAUTION: Do not allow circulation or replenishment pumps to run dry at any time or pumps may be damaged.

37. Allow the processor to warm up to operating temperature; check the system for possible leaks.
38. Feed a piece of media through the processor to confirm proper transport.
39. Check transport speed as follows:
    a. Refer to the calibration procedure.
    b. Enter service code 112.
    c. Compare the preset motor speed value to the actual value.
    d. If the values do not correspond, proceed with the motor calibration procedure.
42. Turn the processor off and turn the main power switch off.
43. Shut off the main water supply and remove the lids, crossover guides, and racks.
44. Using the T-wrench, remove the overflow tubes and allow the tanks to drain completely.
45. Wipe down the tanks to remove any remaining residue and water.

46. Drain and remove the developer filter housing.
47. Install the Millipore Filter Cartridge supplied and re-install the housing.
48. Empty the replenishment containers.
49. Replace the overflow tubes, racks, crossover guides, and lids.
50. Put in the two (2) anti-evaporation covers (stainless steel) inside the racks. Next place the front cover and the two (2) anti-oxidation covers. Refer to Figure 1-26.

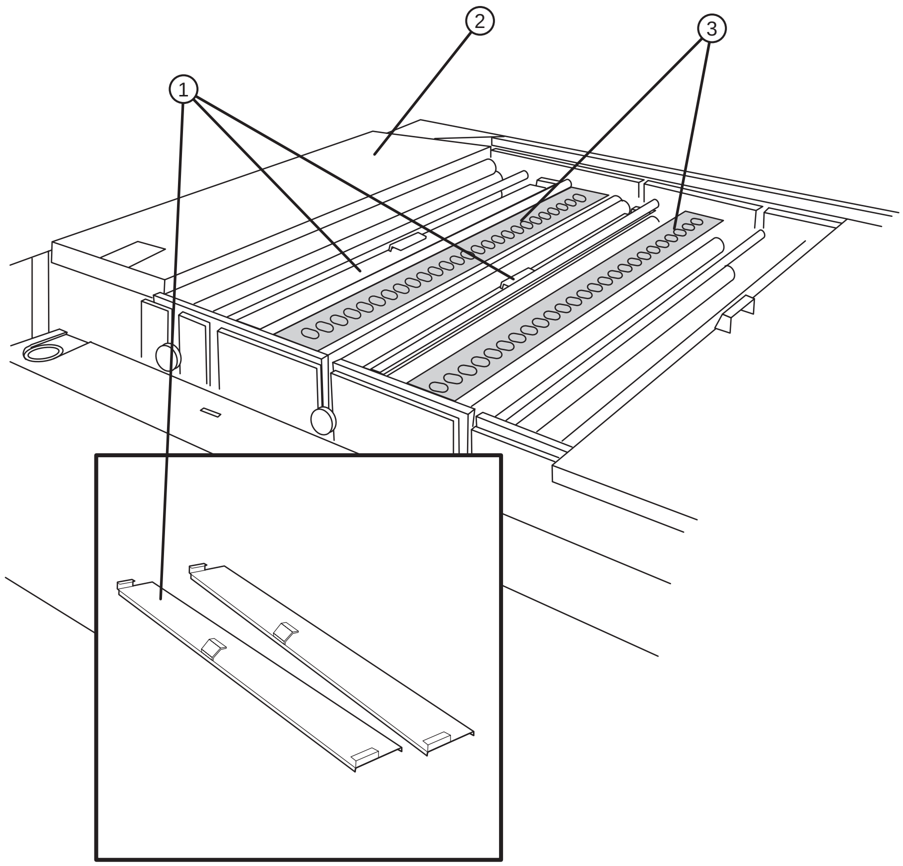


Figure 1-26 Anti-evaporation, front, and anti-oxidation cover locations.
①–Anti-evaporation covers. ②–Forward top cover. ③–Anti-oxidation covers.

51. Put in the middle and rear anti-oxidation covers (plastic) over the racks. Refer to Figure 1-27.

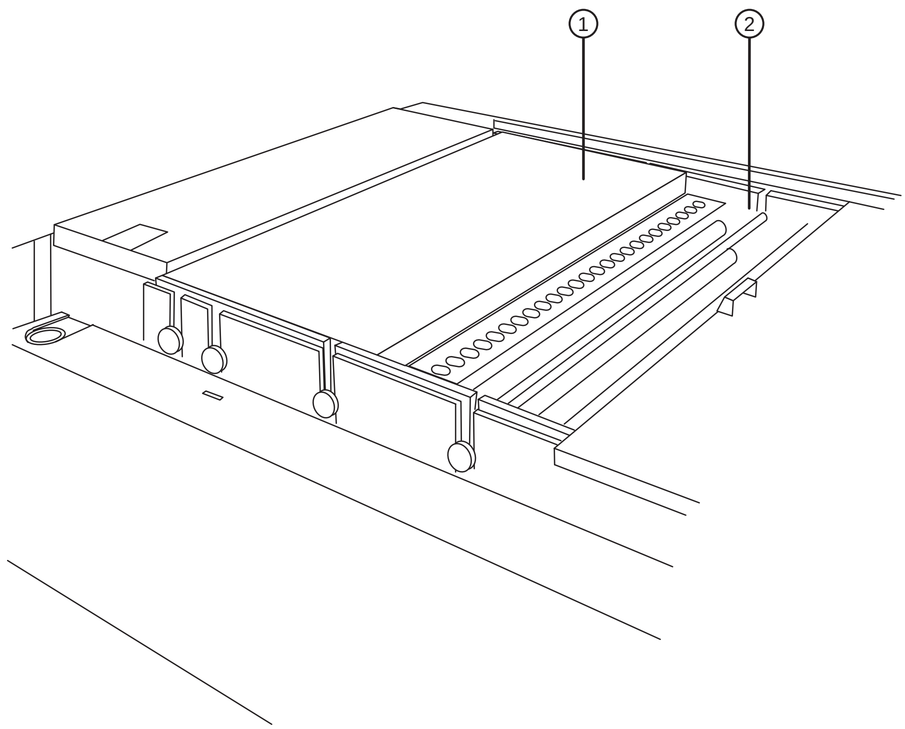


Figure 1-27 Evaporation covers over racks.

①–Middle evaporation cover (over fixer). ②–Developer.

52. Put the Top Covers on in the following order:
    - middle
    - forward (front)
    - rear

    Refer to Figure 1-28.

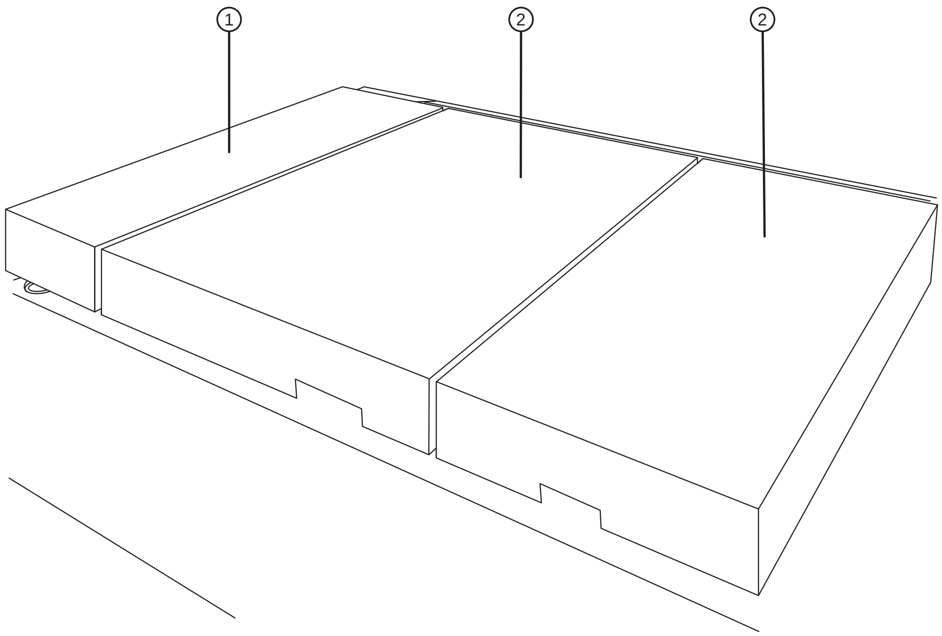


Figure 1-28 Top covers.

①–Forward (front) top cover. ②–Middle top cover. ③–Rear top cover.

Chapter 2:
OLP Functional Analysis

2.1 Introduction

This chapter describes the OLP's boot-up procedures (including the system modes), OLP electronics (including the boards and sensors), OLP racks (including the methods of replenishment).

This chapter contains the following information:

- Description of OLP Boot-up Procedures
  - OLP Standby Mode
  - Idle Mode
  - Ready Mode
  - Operate Mode
  - The OLP Jog Function
- Electronics4
  - The LUTH Computer Board (LCB)
  - The LUTH Power Board (LPB)
  - The LUTH Motot Board (LMB)
  - The Agfa Terminal Board (ATB)
  - Sensors
- OLP Racks
  - Temperature Control
  - Replenishment

2.2 Description of OLP Boot-up Procedures

Immediately after the main switch has been turned on and the OLP has power, an internal communication takes place between the individual circuit boards and various code signals display on the OCP. When information ceases to be displayed, the OLP automatically switches to standby mode.

2.2.1 OLP Standby Mode

While in standby mode, the OLP will be in the following modes:

1. Jog
2. Standby replenishment
3. Topping-up

2.2.2 Idle Mode

When the ON/OFF key is activated, the display shows a message similar to the following:

Dev 30˚ C 20 sec. A or M

Where: Dev 30˚ C = Actual developer temperature.
20 sec = Speed set point.
A = Automatic start-up and auto-stop.
M = Manual start-up and stop.

If the developer temperature is incorrect, the Dev. Temp. Incorrect LED flashes. As long as the temperature remains inaccurate, the OLP cannot start by activating the film input sensors, by pressing MAN.START or the Dryer Saver key. As soon as the developer temperature equals the preset temperature, the processor switches to Ready mode and the Dev. Temp. Incorrect LED stops flashing.

2.2.3 Ready Mode

When all preset parameters have been ahieved and the tank level is sufficient, the OLP switches to Ready mode. While in Ready mode the OLP remains in Jog mode, and the temperature and speed displays on the OCP. The information displayed equals the actual developer temperature and the set developer time. The message appears similar to the following:

Dev 35˚ C 20 sec.

If the developer temperature becomes inaccurate, the processor switches to Idle mode. The processor switches to Operate mode after activating the input sensor(s) or the manual start.

2.2.4 Operate Mode

When the OLP switches to Operate mode, the display shows a message similar to the following:

Dev 35˚ C 20 sec.

When material passes through the OLP, or when Man Start is deactivated the OLP switches to:

- Ready Mode--if all preset parameters are met
- Idle Mode--if the developer temperature is incorrect
- Low Level Mode--if the solution level is low

When the level is too low in either or both the developer and fixer tank, a halt message goes to the imagesetter, no media transports. and the processor automatically disconnects the circulation pumps and heating element in the developer and fixer sections. No Jog Function mode occurs.

If the MAN START keyhas already been activated when the level gets too low, the drive motor and dryer section run continuously until the Man Start key is deactivated. When the correct level is reached, the processor switches to Ready mode or, if the developer temperature is now inaccurate, to Idle mode.

2.2.5 The OLP Jog Function

In order to avoid crystallization on the rollers in the developer and fixer racks, the processor automatically and at preset intervals starts the main motor for the transport rollers and circulation pumps.

2.3 Electronics

The following describes the functions of the OLP computer boards and the sensors.

2.3.1 The LUTH Computer Board (LCB)

The Luth Computer Board (LCB):

- Organizes the input data
- Performs logic operations
- Performs calculations
- Takes account of the values of the internal timers and counters values
- Takes account of the signal stored in the flags
- Organizes the output of the results
- Input and output includes:
  - digital input and output
  - analog input

2.3.1.1 LCB Inputs and Outputs

Inputs and outputs include:

- Digital input and output
- Analog input

Description of LCB Inputs and Outputs

- X501, Input sensors, safety switches (only for OLP input and output sensors and cassette sensor).

  Digital input. (active state = high).

  Connections:
  -1 to 8 and 14 to 21 connected to the input sensors P1 to P8
  -Only for OLP: -9/10 and 22/23 connected to input and output sensors and cassette sensor
  -11/24 connected to the LMB pcb X4A
  -12/25 conneced to the 6 or 4 safety switches (via the LPB pcb X1-13 and X2-2 and the Optocoupler pcb)

  NOTE: The latest production 44 OLPs have two 'front box' and four ''top lid' safety switches.

- X500, Temp and Exit sensor(s) input–Temp sensor inputs. Temperature sensor channels are analog input. A software controlled amplifier gives impedance matching to sensors of platinum, type PT500, used for measuring developer/fixer/dryer temperatures. The amplifier limits the operating area between 0 and +100° C.

  The exit sensor channel (only for OLP) channel is a digital input.

  Connections:
  -1 & -6 connected to P30 exit sensor (only for OLP)
  -3 & -7 connected to P16 dryer temperature sensor
  -4 & -8 connected to P17 fixer temperature sensor
  -5 & -9 connected to P18 developer temperature sensor

- X503, Low and empty level sensors, tacho out signal, waste sensors. Level input accepting square wave signals (50 Hz). Used for level measurements. Signals transmitted and received are galvanically separated from all other signals. Pulse input available to pick up pulses with a frequency of up to 400 Hz.

  Connections:
  -1/9 connected to developer/Fixer tank level sensor
  -2/10 connected to P33 replenishment tank empty sensor
  -3/11 connected to P40 waste developer level (opt.)
  -4/12 connected to X3 LMB 02 pcb tacho out

- X600–Power supply input

  10V AC and 18V AC from the secd. of the transformer.

- X400, RS-232 ATB–Data communication link between the LCB pcb and the Agfa Terminal Board (ATB) power supply.

  Connections:

  -1/2 connected to the ATB L3-1 and L3-2 serial data codes
  -3 connected to the ATB L3-3 12V DC
  -4 connected to the ATB L3-4 ground
  -5 connected to the ATB L3-5 18V AC

- X402, RS-232 OLP Com.– (Only used with the OLP version) Data communication link between the LCB pcb and the imagesetter via L4.

- X200, Output–digital output. Output is constructed as open collectors (active = low). The necessary driving voltage (+12V) is sourced from the LPB pcb.

  Connections:

-1 connected to the LPB X1-4 control the K9	(Fix. repl. pump)
-2 connected to the LPB X1-5 control the K8	(Dev. repl. pump)
-3 connected to the LPB X1-6 control the K7	(Dryer fan and basic heat)
-4 connected to the LPB X1-7 not used	Q5
-5 connected to the LPB X1-8 control the Q3	(Fix heat 1500W)
-7 connected to the LPB X1-10 control the Q1	(Dev heat 1500W)
-8 connected to the LPB X1-11 control the K12	(Drive motor)
-10 connected to the LPB X1-2 control the K11	(Circ. pumps)
-11 connected to the LPB X1-3 control the K10(	Aqua stop sol.)
-12 connected to the LPB X7-2 control the Q4 & Q6 via X1-12	
-13, -6 connected to the LPB X1-9 related to K2	(not used)
-18 connected to the LPB X1-13	Ground
-21/22 connected to the LPB X1-1	12V DC

- 2, LUTH Power Board (LPB)–The LPB switches the necessary 220 V components on and off. The Triac board includes 5 long-life zero-crossing Triac channels and 7 power relays with noise suppression circuits across the contacts. Because the replenishment pumps operate on half-wave rectified AC, two diodes are mounted at the appropriate relays.

- X1, X2–Input to trigger circuit (plug-in unit) of Triac channels and coils of power relays.
- X3 pins 1 and 2–10 VAC input for 12 VDC unregulated power supply.
- X3 pins 3 to 4–DC output (12 V) to electrical and condensation fans.
- X2–Safety switches connection. Open=> no power to trigger circuit and relay coils.
- F, N (Phase, Neutral) Same as L1/L2–See the electrical diagram Triac/Relay PCB.

  Main power input terminals. The power source may have 2, 3, 4 wires including ground.
- 1–57, printed circuit board terminals–Switched output to water solenoid valve, heating elements, blower, circulation, replenishment pumps, main motor, and step-down transformer.

2.3.2 The LUTH Power Board (LPB)

The Luth Power Board switches the necessary 2230V components on and off. The LPB pcb includes:

- Five long life zero cross Triac channels (only four are used)
- Seven power relays with noise suppression circuits aross the contacts (only six are used)
- 220V AC power supply to he prim. of the 24V AC transfo for the LMB02 and the crane hoist transfo
- Voltage supply for the six safety switches. Four are for the top cover's wet and dryer sections; two are the the front box (table lid) only in the latest OLP version.
- Two diodes for the half-wave rectified AC replenishment pumps.

- X1, X2, X3 and X7 input to trigger the circuit of the triac channels and coils of power relays and 12V supply. See below.
  - X1:

    -l 12V DC connected to the LCB pcb X200 -212/22

    -2 from X200-10 input to K11 (circ. pumps)

    -3 from X200-11 input to K10 (Aqua stop sol)

    -4 from X200-1 input to K9 (fix, repl. pump)

    -5 from X200-2 input to K8 (dev, repl. pump)

    -6 from X200-3 input to K7 (dryer, fan, basic heat)

    -7 (not used)

    -8 from X200-5 input to Q3 (1500W fix. heater)

    -9 (not used)

    -10 from X200-7 input to Q1 (1500W dev. heater)

    -11 from X200-8 input to K12 (prim. 24V trafo LMB02)

    -12 input to Q6 via X7-2 (dryer heat 2)

    -13 from X200-18 Gound-Optocoupler pcb diode
  - X2:

    -1/2 Front and top lids safety switches (front safety switch exists only on the latest OLP version)

    -2 Optocoupler pcb diode+ (to X501-12/25)
  - X3: Input 10V AC, output 12V DC

    -1/2 input 10V AC from trafo.

    -3/4 output 12V DC to P34 condensation fan

    -5/6 output 12V DC to P34 electronics fan
  - X7:

    -2 connected to X1-12 input to Q6

    connected to X200-12 input to Q4

2.3.3 The LUTH Motor Board (LMB)

The Luth Motor Board (LMB):

- Amplifies the motor preset value to the corresponding high voltage to drive the main motor.
- Senses and limits the armature current.
- Receives and converts I/R pulse preset values.

Description of Inputs and Outputs (P/N 52024000100)

- X102 1, 2–24V AC input.
- X102 5, 6–0-24 DC output.
- X1 1, 2, 3–Optical interrupter.
- X3 1, 2–Tacho feedback to CPU.
- U201–Infrared receiver.
- X4 1,2–Motor overload signal.

2.3.4 The Agfa Terminal Board (ATB)

The Agfa Terminal Board (ATB):

- Displays convenient information
- Organizes the output from activated keys
- Organizes the input data

Description of Inputs and Outputs

1, 2–Data communication link between the LCB and the Agfa Terminal Board (ATB). RS-232 serial data coded as ASCII characters are interchanged.

2.3.5 Sensors

- Optical Interrupter–This device consists of a transmissive sensor with four (4) wires and connectors. The operating wavelength is 950 nm. The detector is a Photologic IC with Schmitt-Trigger output. Aperature size is 0.5 mm.
- Film Sensors (Input, Input/Output, Exit)–This sensor is an ultra low force motion sensor. It features a long-life reed switch, an integral actuator arm, and a magnet.

  Operating Parameters:

  Off point: Less than 10° rotation from rest position.

  On point: Greater than 3° rotation from rest position.
- Temperature Sensor–The sensitive element is a platinum-coated ceramic wafer manufactured by thin film techniques. The exact value is obtained by laser trimming.

2.4 OLP Racks

Transport takes place through seperate sections called racks. They are the:

- Developer
- Fixer
- Wash and dryer

The racks are the most important parts of the processor. Each rack consists of side plates with rollers driven by worms and gears to ensure an even and stable transport.

2.4.1 Temperature Control

The temperature of the developer and fixer baths are controlled electronically to obtain optimum developing results. Constant levels are maintained by means of immersion heaters and circulation pumps.

2.4.2 Replenishment

Three types of automatic replenishment take place within the tanks:

- Automatic
- Timed
- Topping-up

A manual replenishment procedure also exist on the OLP. See below for a description of the four replenishment functions.

2.4.2.1 Automatic Replenishment

Automatic replenishment keeps the concentration of developer and fixer chemistries at a contant level. This procedure adds chemistry to compensate for that lost during processing. A description of the procedure follows.

The processor pumps a constant 100cc of developer and fixer replenishment liquid into the tanks. A calculation based on the preset replenishment value, the area of the material, and the percentage density key determines the frequency that the replenishment liquid is pumped.

When presetting replenishment values, the information included in the material box as well as the information provided by the manufacturer of chemicals must be referred to. When material is fed, the processor's electronics calculate the material width and length, which is detected by the film input switches.

2.4.2.2 Timed Replenishment

For chemistry replacement due to evaporation, the OLP has a built-in timer replenishment system. Timed replenishment ensures a constant level of developer and fixer 24 hours a day in both run and standby modes.

Since the amount of chemicals pumped into the tanks is always 100 cc, the system automatically calculates the time interval between each pulse as 100 cc x 24 hours divided by the preset value:

$$\text{Interval Time} = \frac{\text{100 cc x 24 hours}}{\text{Preset oxy stdb replenishment value}} = \text{hours}$$

All calculations base on a 50% density. Consequently, the basis of all values displayed is 50% density.

2.4.2.3 Topping-up Replenishment

If a low level condition occurs after the system has been switched off on the control panel for more than 30 minutes, the topping-up replenishment function automatically comes on. This procedure pumps one litre of developer and one litre of fixer into the baths. If this action offsets the low level condition, the processor will be ready the next time it is switched on. If the action fails to offset the low-level condition, the system goes to low level mode, jog mode stops, and the low-level light flashes.

If the level is correct after topping up and a low level occurs again after 30 or more minutes, the system again activated the topping-up replenishmen mode.

2.4.2.4 Manual Replenishment

Pressing the MAN REPL key releases replenisher manually. Each activation adds 100 cc of developer and fixer.

Chapter 3:

OLP Component Removal/ Replacement

3.1 Introduction

This chapter provides instruction for removing and replacing components in the Avantra 36/44 On-Line Processor (OLP).

This chapter contains information about the:

- Drive Motor
- CPU-OLP
- LUTH Motor Control Board
- LUTH Rectifier Board (LRB)
- Power Board
- Circulation Pump
- Developer or Fixer Replenishment Pumps
- Heating Element
- Wet Section Temperature Sensor
- Dryer Section Temperature Sensor
- Dryer Blower Motor Assembly
    - Dryer Heater Element
    - Dryer Blower
- Entry Rack Assembly
- Drive Belt
- Drive Shaft

3.2 Drive Motor

The following describes how to remove and replace the drive motor.

Tools Required: Phillips screwdriver, 13mm socket and ratchet wrench

Remove:

1. Turn off and unplug the OLP.
2. Remove the side panel at the top left.
3. Using a phillips screwdriver, remove the bracket with the encoder sensor/ sensor connector attached. Refer to Figure 3-1.

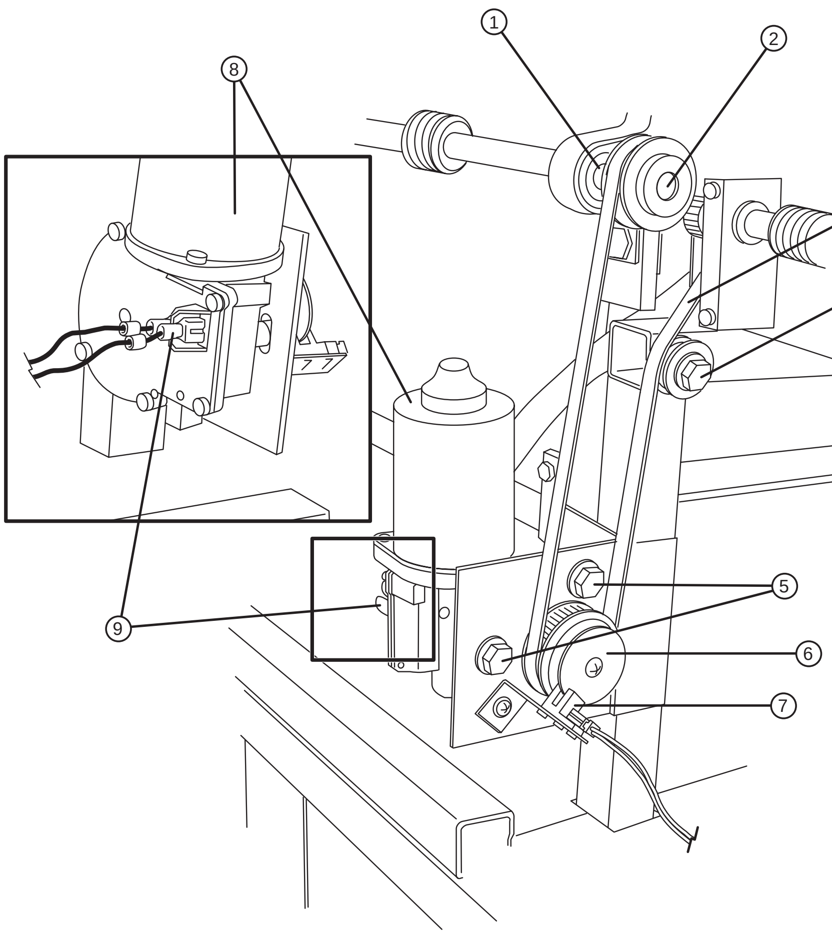


Figure 3-1 The drive motor.

①– Drive wheel set screw. ②–Drive wheel. ③–Drive belt. ④–Idler.
⑤–Three mounting bolts. ⑥–Encoder disk. ⑦–Encoder sensor/sensor connector.
⑧–Drive motor. ⑨–Drive motor power connectors (M1, M2).

4. Disconnect the two (2) power connectors (M1 and M2). Refer to Figure 3-1.

NOTE: Note the position of the power connectors for replacement.

5. Using a phillips screwdriver, remove the encoder disk at the end of the shaft. Refer to Figure 3-1.
6. Remove the set screw from the belt wheel.
7. Loosen the three (3) mounting bolts (near the encoder disk). Refer to Figure 3-1.
8. Lift the belt from the idler and remove the idler's securing bolt. Refer to Figure 3-1.
9. Remove the three (3) mounting bolts and pull the motor out.

Replace:

1. Hold the motor in place using three (3) mounting bolts. Do not tighten.
2. Reattach the belt wheel and encoder disk to the end of the shaft.
3. Replace the belt around the idler and belt wheel.
4. Adjust the motor and motor mount to achieve the proper belt tension.

   Ideally, the belt should not be too tight or too loose. Allow for a 1/4" deflection left and right of center.
5. Reconnect the two (2) power connectors (M1 on the left and M2 on the right).

CAUTION: Improperly positioning the power connectors causes the motor to run backward and will damage the system.

6. Replace the sensor bracket and realign the sensor with the encoder disk.
7. Plug in the OLP and turn it on.
8. Press Manual Start.
9. Test the drive and the belt alignment. Make adjustments, if necessary.
10. Recalibrate the motor speed. Refer to Chapter 4, OLP Maintenance.

3.3 CPU-OLP

The following describes how to remove and replace the OLP central processing unit (CPU).

Tools Required: Phillips screwdriver, 1/4" nut driver

Remove:

1. Turn off and unplug the OLP.
2. Remove the top covers.
3. Remove the top back panel.
4. Pull the electronics box straight out on its rollers.
5. Remove the seven cable plugs at the rear of the box. Refer to Figure 3-2.
6. Remove all fourteen (14) standoffs at the rear of the box. Refer to Figure 3-2.

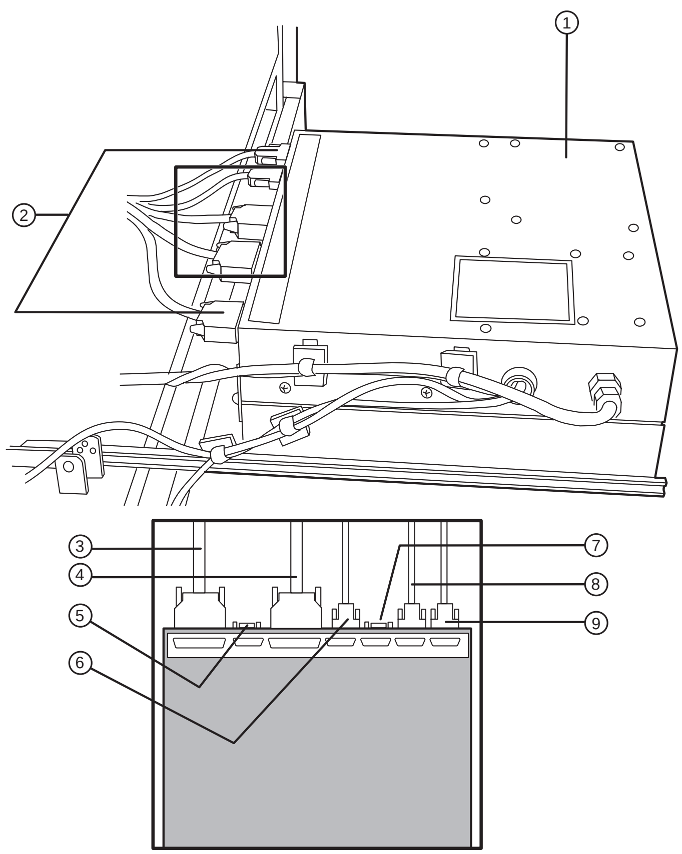


Figure 3-2 The electronics box with rear standoffs and connectors.

①– CPU electronics box. ②–Seven connectors and fourteen standoffs. ③–X503level and feedback. ④–X501 film sensors. ⑤–X502 Startbox. ⑥–X500 temperature sensor. ⑦–X400 RS232/CL. ⑧–X402 OLP Interface. ⑨–X400 ATB.

7. Using a phillips screwdriver, remove the four (4) hinge screws at the rear of the box. Remove the four central screws only. Refer to Figure 3-3.

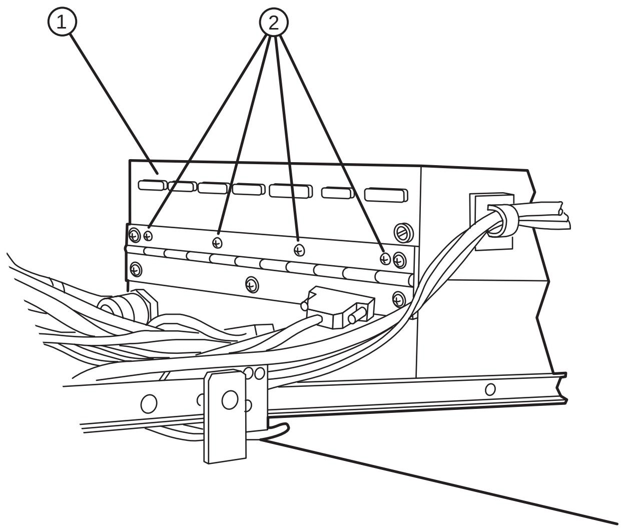


Figure 3-3 Electronics box rear screws.

①– Electronics box. ②–Four rear screws.

8. Using a phillips screwdriver, remove the four (4) screws on the top and the two (2) screws on each side of the box. Refer to Figure 3-4.

9. Open the top of the box and disconnect the:

   a. Low voltage CPU power connector

   b. Power board cable

   Refer to Figure 3-4.

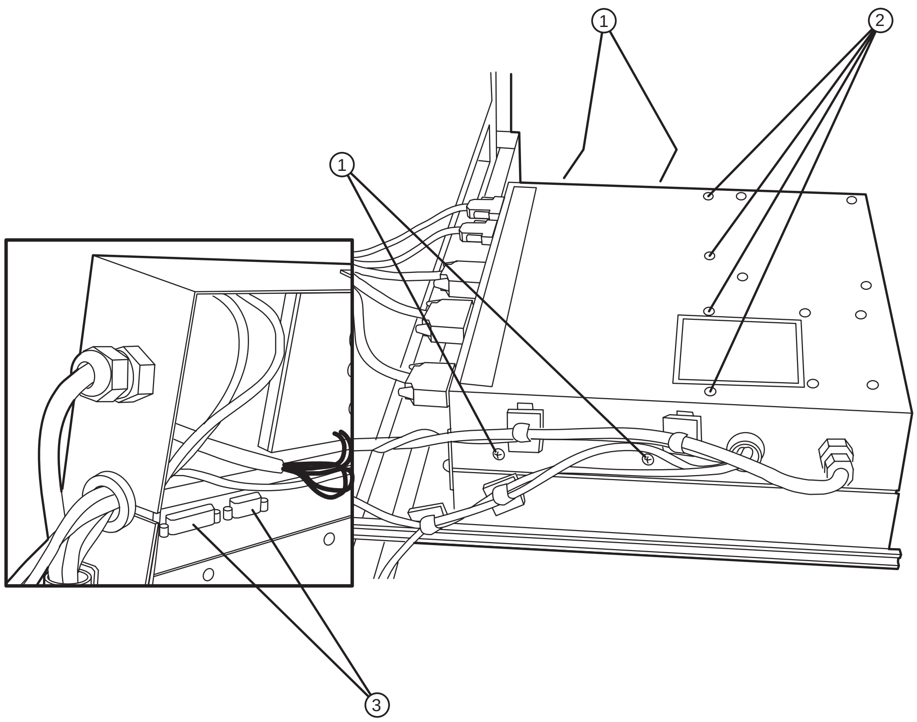


Figure 3-4 Electronics box side/top screws and power cables.

①–Side screws. ②–Four top screws. ③–Low voltage and CPU power cables.

10. Remove the three (3) phillips screws securing the inner cover. Refer to Figure 3-5.
11. Remove the six (6) standoffs at the rear. Refer to Figure 3-5. Remove the cover.

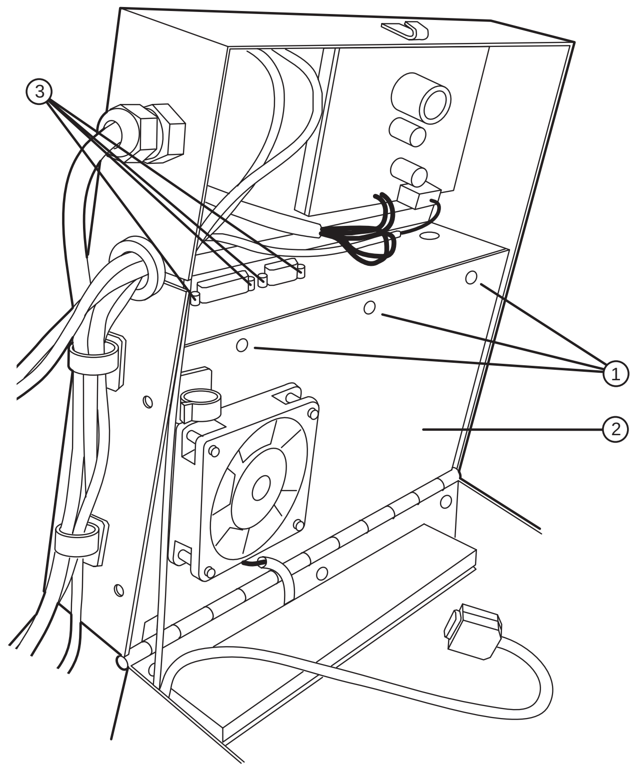


Figure 3-5 CPU cover screws and standoffs.

①–Three CPU cover screws. ②–CPU cover. ③–Six standoffs.

12. Remove the CPU fuse connectors from the PCB. Refer to Figure 3-6.

NOTE: The fuse connectors can be replaced in any order.

13. Remove the three (3) mounting screws. Refer to Figure 3-6.

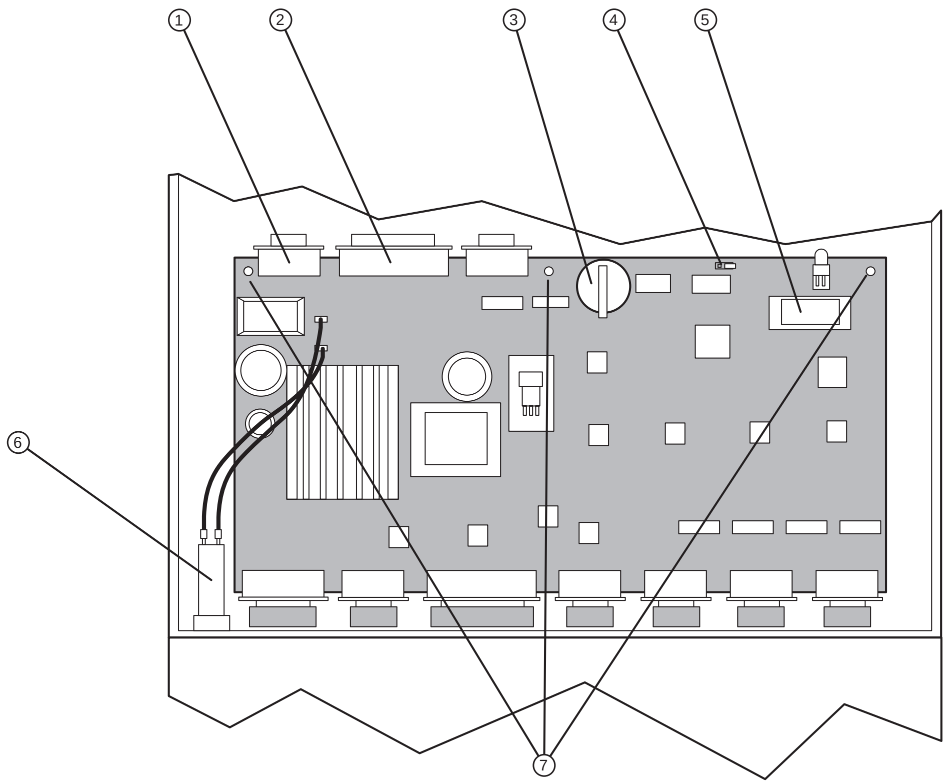


Figure 3-6 The CPU board with fuse connectors and mounting screws.

①–Low voltage connector. ②–Power cable connector. ③–Lithium battery.
④–Fahrenheit/Centigrade jumper. ⑤–EEPROM. ⑥–CPU fuse connectors.
⑦–Three mounting screws.

Replace:

1. Reverse the steps in the removal procedure above.

NOTE: Check the battery on the new CPU and remove the paper (if present) between the battery and ground retaining clip. check and adjust the temperature display mode jumper to the preferred mode (Fahrenheit or Centigrade). Refer to Figure 3-6.

3.4 LUTH Motor Control Board

The following describes how to remove and replace the motor control board.

Tools Required: Phillips screwdriver, needle-nose pliars

Remove:

1. See the removal procedures in Section 3.3, CPU-OLP for exposing the board.
2. Remove the connectors at X5 and X7. Refer to Figure 3-7.
3. Remove the connectors at X6 and X2. Refer to Figure 3-7.

NOTE: Note the position of the power connectors for replacement.

4. Using a needle-nose pliars, release the two (2) nylon standoffs from the front of the board. Refer to Figure 3-7.
5. Using a phillips screwdriver, remove the mounting screws at the rear. Refer to Figure 3-7.

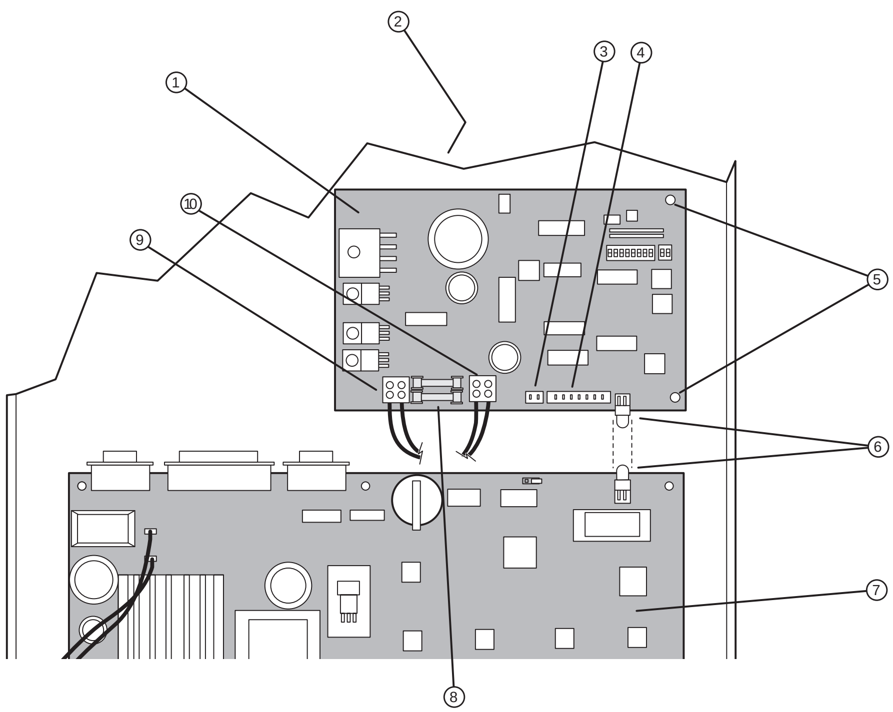


Figure 3-7 The LUTH motor control board.

①–Motor control board. ②–Two rear mounting screws. ③–X5 connector. ④–X7 connector. ⑤–Two mounting standoffs. ⑥–Motor board and CPU LED alignment. ⑦–CPU board. ⑧–Jumper fuses. ⑨–X6 wiring. ⑩–X2 wiring.

Replace:

1. Do not clean the silicon off the back of the chassis.
2. Reverse the order of the removal steps above, being careful to reattach the connectors into their proper plugs.
3. When the board is in place, make sure that the LED is in proper alignment with the CPU LED. Refer to Figure 3-7.
4. Check the jumper settings. Refer to Chapter 4, OLP Maintenance.
5. Perform the motor speed calibration. Refer to Chapter 4, OLP Maintenance.

3.5 LUTH Rectifier Board (LRB)

Tools Required: Needle-nose pliars, small flathead screwdriver

Remove:

1. See the removal procedures in Section 3.3, CPU-OLP for exposing the board.
2. Using a small flathead screwdriver, remove the wires from the two (2) terminal blocks on the bottom of the board. Refer to Figure 3-8. Note the wire positions for replacement.
3. Using a needle-nose pliars, release the four (4) nylon standoffs. Refer to Figure 3-8.

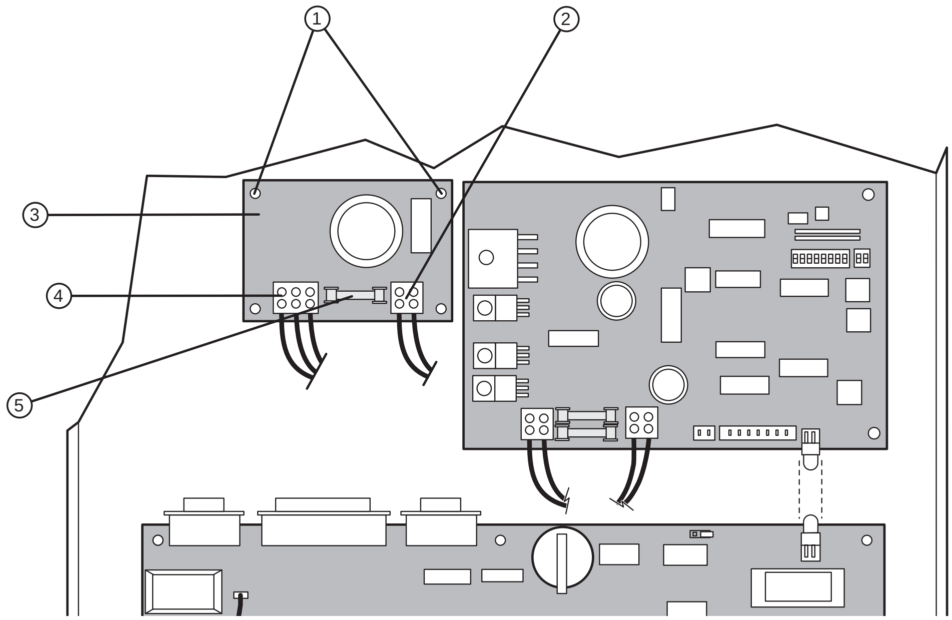


Figure 3-8 LUTH rectifier board (LRB).

①–Four nylon standoffs. ②–Terminal block. ③–LRB board.
④–Terminal block. ⑤–Fuse.

Replace:

1. Reverse the steps in the removal procedure above.

CAUTION: Be careful to return the wires to their proper places in the terminal blocks.

3.6 Power Board

The following describes how to remove and replace the power board.

Tools Required: Phillips screwdriver, small flathead screwdriver

Remove:

1. See the removal procedures in Section 3.3, CPU-OLP for exposing the board.

2. Remove the plastic cover plate. Refer to Figure 3-9.

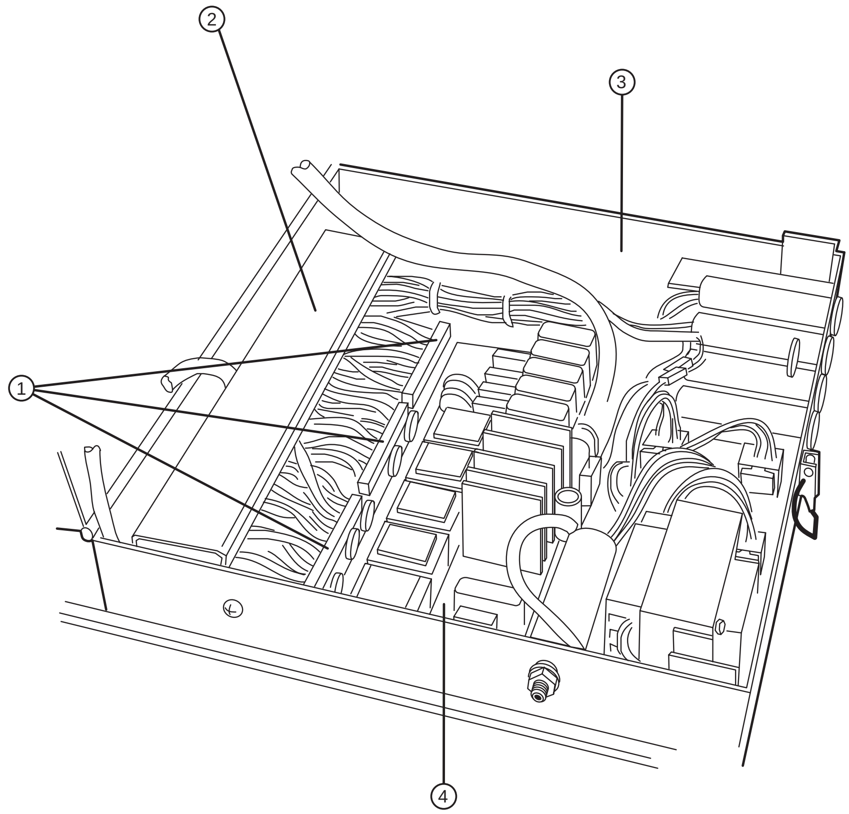


Figure 3-9 Electronics box with power board.
①–Terminal blocks. ②–Plastic cover. ③–Electronics box. ④–Power board.

3. Remove the connectors at:
   a. X3 (red, brown)
   b. X7 (pink, gray)
   c. X1 (main connector)
   d. X2 (red/brown, white)

   Refer to Figure 3-10. Note the wire colors for proper replacement.

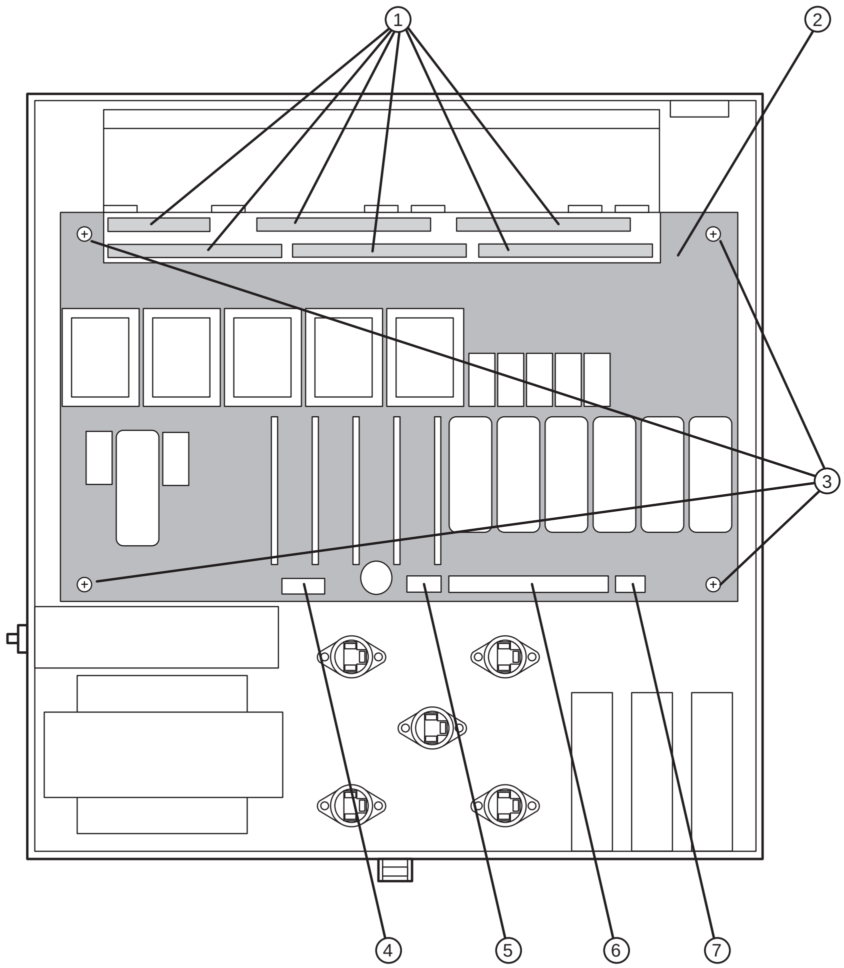


Figure 3-10 Power board.

①–Terminal strips. ②–Power board. ③–Mounting screws.
④–X3 connector. ⑤–X7 connector. ⑥–X1 connector. ⑦–X2 connector.

4. Using a small flathead screwdriver, remove the high voltage connectors from the terminal blocks. Refer to Figure 3-10.

   Note the wire labeling for proper replacement.

5. Using a phillips screwdriver, remove the four (4) mounting screws, one at each corner. Refer to Figure 3-10. Remove the board.

Replace:

1. Reverse the steps in the removal procedure above.

3.7 Circulation Pump

The following describes how to remove and replace the circulation pump.

Tools Required: Flathead screwdriver, open end wrench

Remove:

1. Turn off and unplug the OLP.
2. Remove the top and side covers.
3. Drain the tank.

CAUTION: Even with the tanks drained, chemistry will remain in the hose connections. Wear rubber gloves and have rags ready for spillage before proceeding to the next step.

4. Using a flathead screwdriver, loosen the hose clamps securing the two (2) hoses to the pump. Refer to Figure 3-11. Remove both hoses.

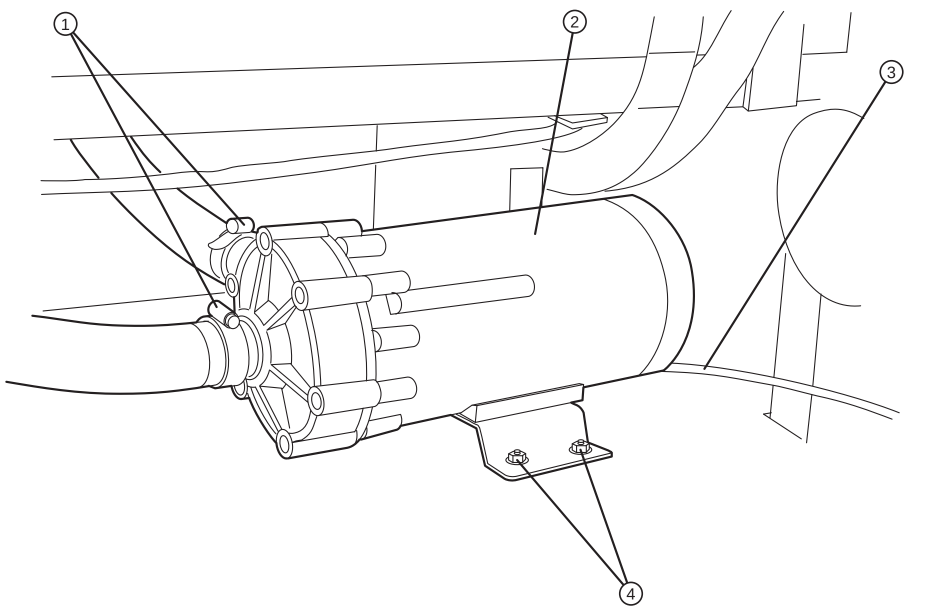


Figure 3-11 The circulation pump.

①–Hose clamps. ②–Circulation pump. ③–Power lines (electrical connection). ④–Mounting plate.

5. Follow the black, white and green power wires (electrical connection) to the terminal block and disconnect. Refer to Figure 3-11.

NOTE: Note the wire positioning for proper replacement.

6. Using an open end wrench, remove the nuts in the mounting plate. Refer to Figure 3-11.

Replace:

1. Reverse the steps in the removal procedure above.

3.8 Developer or Fixer Replenishment Pumps

The following describes how to remove and replace the replenishment pumps.

Tools Required: Socket wrench (7 mm)

Remove:

1. Turn off and unplug the OLP.
2. Remove the top and side covers.

CAUTION: Even with the tanks drained, chemistry will remain in the hose connections. Wear rubber gloves and have rags ready for spillage before proceeding to the next step.

3. Remove the suction pipe from the replenishment container and drain any excess chemistry in the hose.
4. Disconnect the hoses at the pump. Refer to Figure 3-12 and Figure 3-13.
5. Remove the J-hook from the side of the tank.
6. Drain off the excess chemistry in the hose.
7. Remove the hose from the pump.
8. Follow the red, white, and green/yellow power wires (electrical connection) to the terminal block and disconnect.

NOTE: Note the wire positioning for proper replacement.

9. For the rubber mount style:
   a. Use a 7 mm socket wrench to loosen the nut in the mounting block.
   b. Move the pump to the left and pull it straight up and out.
10. For the spring mounted style, remove the screws holding the spring mount pump bracket and remove the pump and bracket.

Replace:

1. Reverse the steps in the removal procedure above.
2. Perform the pump calibration procedure. Refer to Chapter 4, OLP Maintenance.

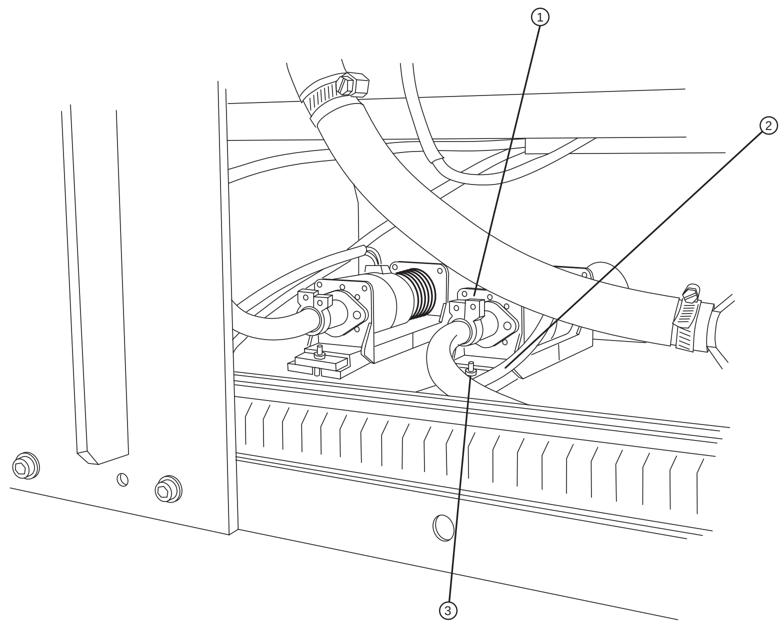


Figure 3-12 The fixer pump.

①–Fixer replenishment pump. ②–Electrical connection. ③–Mounting block.

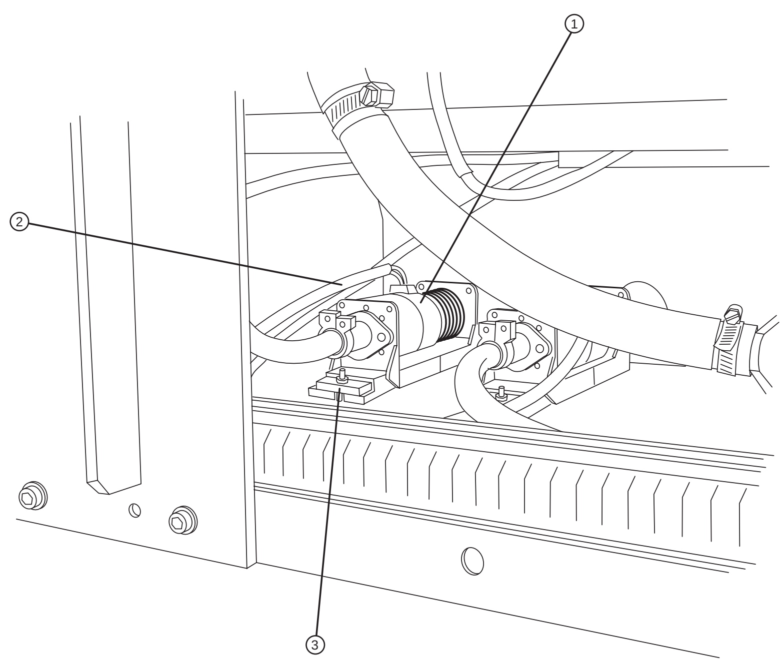


Figure 3-13 The Developer Pump.

①–Developer pump. ②–Power wires. ③–Mounting block.

3.9 Heating Element

The following describes how to remove and replace the heating element.

Tools Required: Adjustable open end wrench

Remove:

1. Turn off and unplug the OLP.
2. Remove the top and side covers.
3. Drain the tank.
4. Follow the red, white, green/yellow power wires (electrical connection) to the terminal block and disconnect. Refer to Figure 3-14.

   Note the wire positioning for proper replacement.
5. Loosen the PVC nut on the outside of the tank. Refer to Figure 3-14.
6. Slide the heating element out. Refer to Figure 3-14.

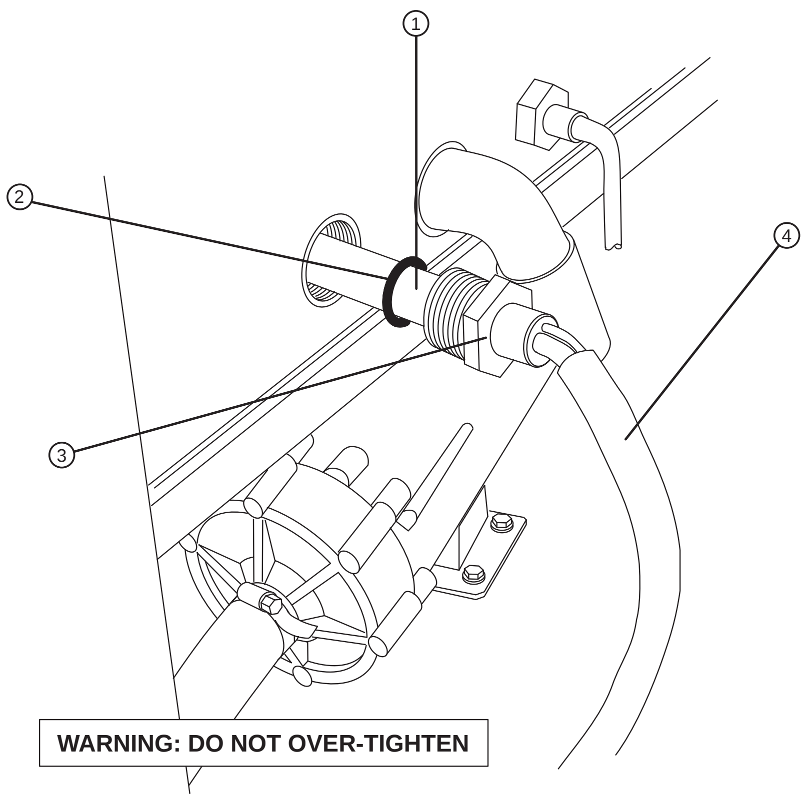


Figure 3-14 The heating element assembly.

①–Heating element assembly. ②–Heating element O-ring.
③–PVC compression nut. ④–Power wires (electrical connector).

Replace:

1. Insert the element and make certain that the O-ring is flush with the PVC nut before tightening. .

CAUTION: Do not over tighten the PVC nut.

---

2. Reconnect the wires in their proper positions in the terminal block.
3. Refill the tank with water and check for leaks.
4. Reverse Steps 2 and 1 in the removal procedure above.

3.10 Wet Section Temperature Sensor

The following describes how to remove and replace the temperature sensor.

Tools Required: Adjustable open end wrench

Remove:

1. Turn off and unplug the OLP.
2. Remove the top and side covers.
3. Drain the tank.
4. Using an open end wrench, loosen the PVC nut. Refer to Figure 3-15.
5. Pull the sensor out. Refer to Figure 3-15.

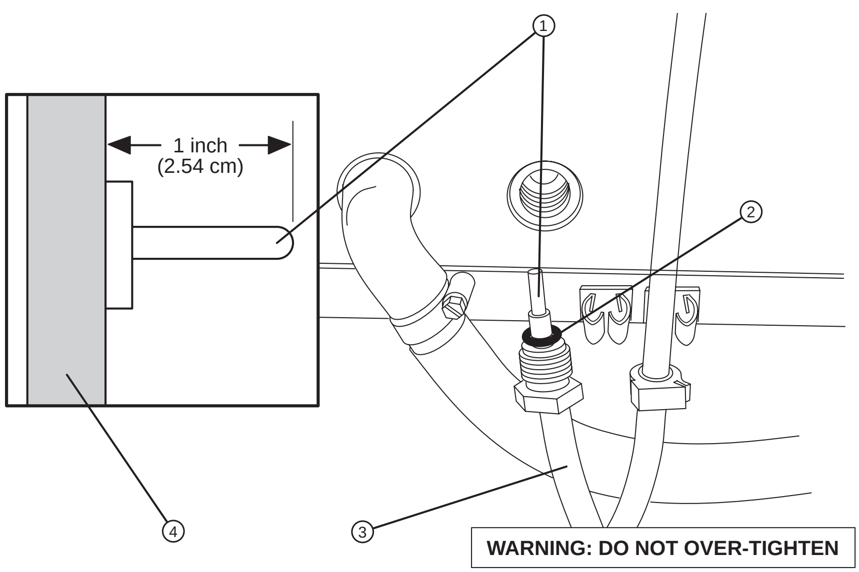


Figure 3-15 Heating element temperature sensor and O-ring.
①–Temperature sensor. ②–O-ring.③–Power wires. ④–Tank wall.

6. Pull the cover from the chamber harness and disconnect the connector.

Replace:

1. Reverse the removal procedure above being careful that the distance between the tank wall and the tip of the sensor does not exceed 1". Refer to Figure 3-15.

3.11 Dryer Section Temperature Sensor

1. Turn off and unplug the OLP.
2. Remove the top covers.
3. Remove the top back panel.
4. Pull the electronics box straight out on its rollers (see Figure 3-2).
5. Using a socket wrench, loosen the PVC nut.
6. Pull the sensor out. Refer to Figure 3-16.

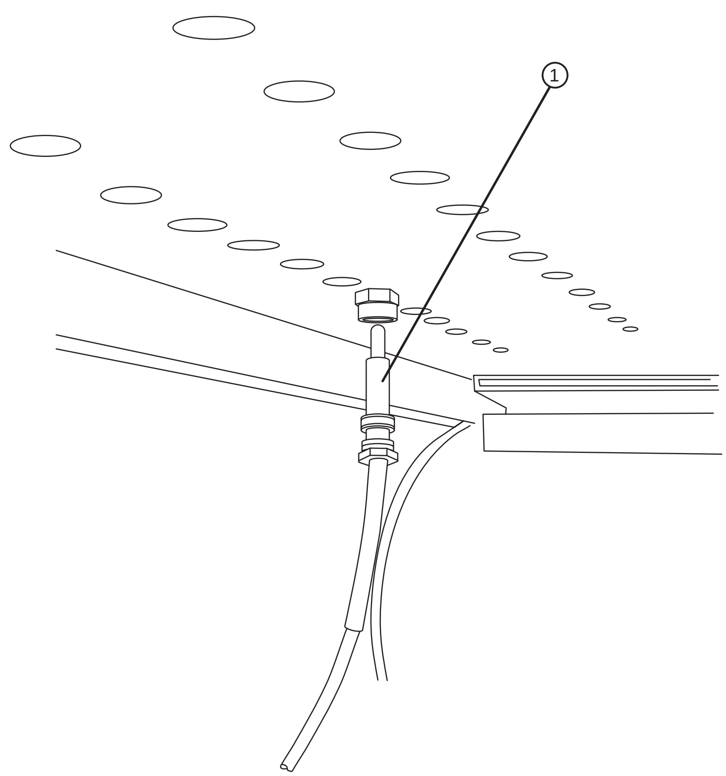


Figure 3-16 Dryer temperature sensor.

7. Disconnect the connector from the low voltage harness.

Replace:

1. Reverse the removal procedure above.

NOTE: Unlike the wet section temperature sensor, the depth of insertion in not important.

3.12 Dryer Blower Motor Assembly

3.12.1 Dryer Heater Element

The following describes how to remove and replace the dryer heater element.

Tools Required: Tie cutters, phillips screwdriver

Remove:

1. Turn off and unplug the OLP.
2. Remove the top covers and left side panel.
3. Cut the tie wrap holding the wires to the top right part of the front plate. Using a phillips screwdriver, remove the screw in the tie wrap holder. Refer to Figure 3-17.
4. Remove the screw and ground wire in the upper left part of the front plate. Refer to Figure 3-17.
5. Remove the two screws in the bottom of the front plate. Refer to Figure 3-17.
6. Slide the plate up and out.

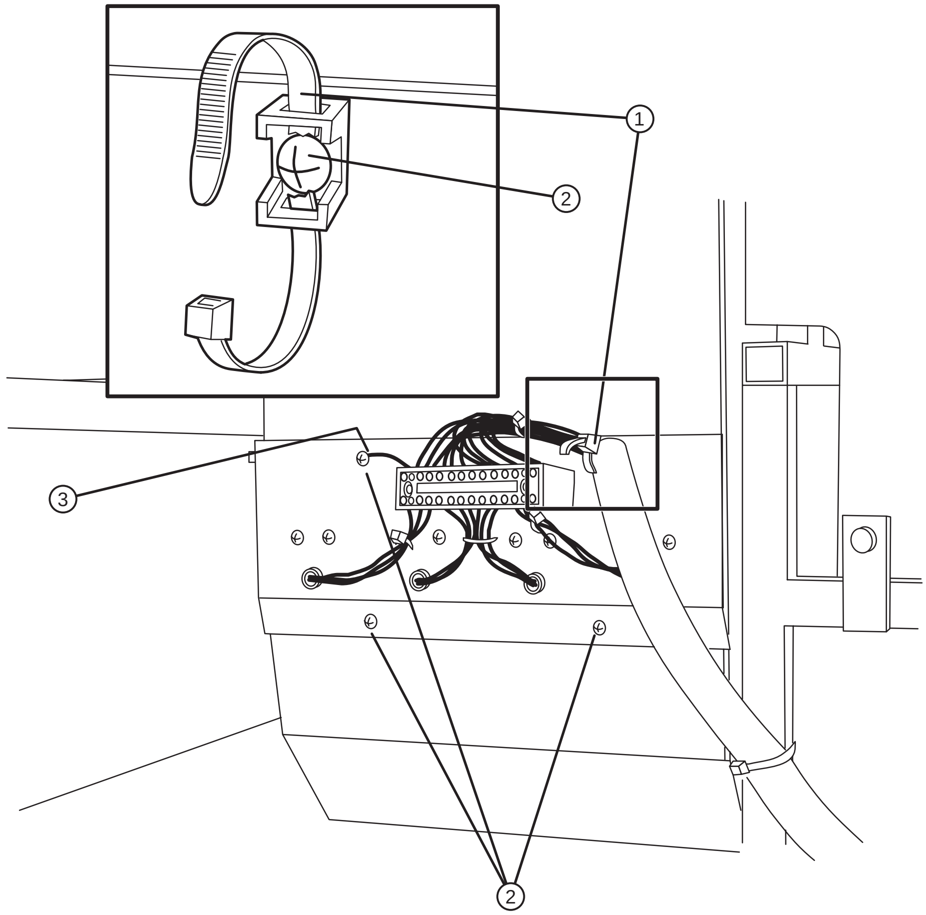


Figure 3-17 Dryer heater element front plate.

①–Tie wrap/mounting screw fixture. ②–Dryer element mounting screws.
③–Grounding wire.

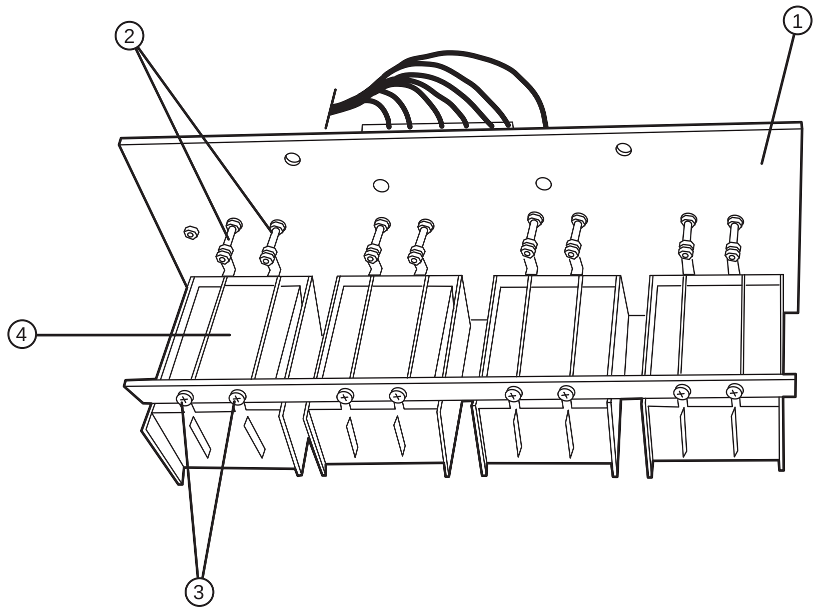


Figure 3-18 Dryer assembly (from the rear).

①–Dryer assembly. ②–Element mounting screws.
③–Rear element mounting bolts. ④–Dryer element.

7. From the rear, remove the two (2) element mounting bolts. Refer to Figure 3-18.
8. From the front, remove the two (2) element mounting screws. Refer to Figure 3-18.
9. Using a small flathead screwdriver, remove the three (3) corresponding wires from the terminal block at the front of the plate. Refer to Figure 3-17.

CAUTION: Note the wire numbering for proper replacement.

Replace:

1. Reverse the order of the removal procedures above being careful to seat the wires in their proper places.

3.12.2 Dryer Blower

The following describes how to remove and replace the dryer blower.

Tools Required: Tie cutters, phillips screwdriver

Remove:

1. Turn off and unplug the OLP.
2. Remove the top covers and left side panel.
3. Open up the upper half of the dryer section.
4. Remove the heating elements. See the removal procedure in Section 3.12, Dryer Blower Motor Assembly above.
5. Remove the two (2) screws at the top of the dryer/blower unit. Refer to Figure 3-19.
6. Cut the tie wraps around the sensor on the frame. Cut the tie wrap holding the wires to the left side of the dryer/blower housing. Refer to Figure 3-19 and Figure 3-20.
7. Using a phillips screwdriver, remove the two (2) screws securing the sensor to the frame. Refer to Figure 3-19.

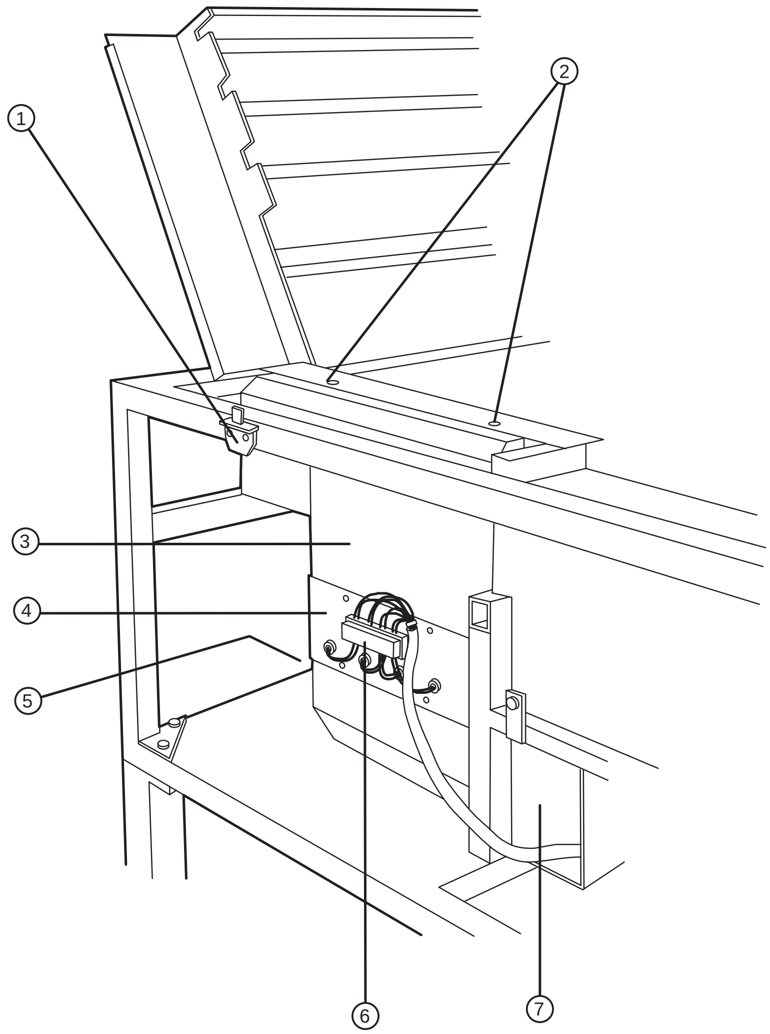


Figure 3-19 Dryer blower.

①–Sensor. ②–Top screws. ③–Dryer/blower unit.
④–Dryer heating elements. ⑤–Left side screws/electrical connections.
⑥–Terminal block. ⑦–Right side screws.

8. Remove the wires in the terminal block located on the left side of the housing:

   a. #1

   b. #3

   c. #2

   d. #4 (green/yellow ground wire)

   Refer to Figure 3-20.

CAUTION: Note the numbering of the wires for proper replacement.

   Remove the two (2) screws in the terminal block. Refer to Figure 3-20.

9. Remove the two (2) blower mount screws and pull the housing out.

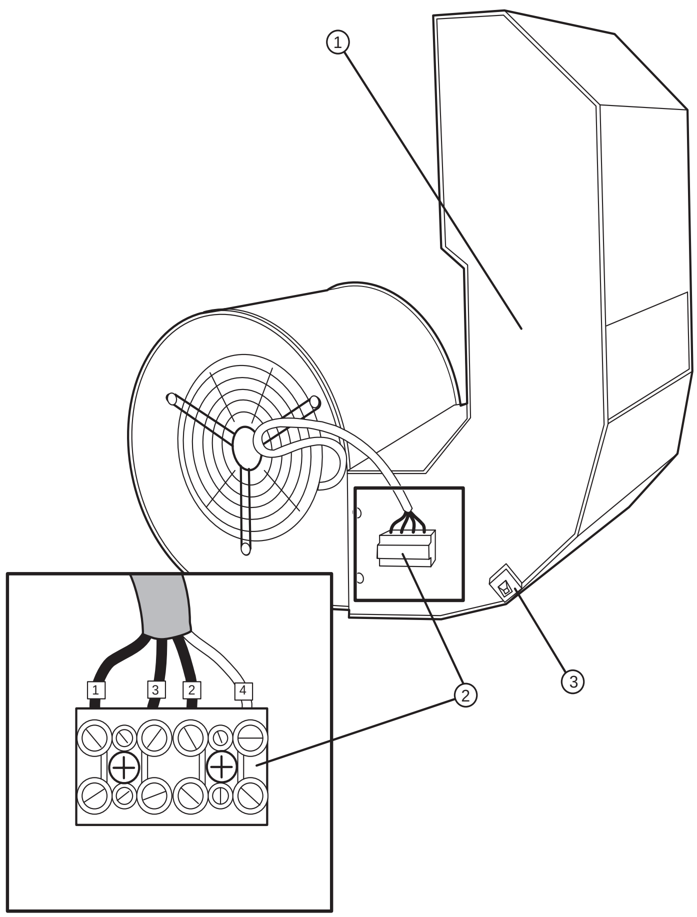


Figure 3-20 Dryer blower assembly.

①–Blower/dryer assembly. ②–Terminal block. ③–Blower mount screws.

Replace:

1. Detach the duct from the old blower and attach it to the new blower.
2. Reverse the order of the removal procedures above being careful to seat the wires in their proper places.

3.13 Entry Rack Assembly

3.13.1 Drive Belt

The following describes how to remove and replace the entry rack drive belt.

Tools Required: Tie cutters, phillips screwdriver, 10mm wrench

Remove:

1. Turn off and unplug the OLP.
2. Remove the top covers.
3. Remove the side covers.
4. Remove the bolts securing the bearing blocks. Refer to Figure 3-21.
5. Remove the bearing blocks and drive shaft.
6. Remove the drive belt.

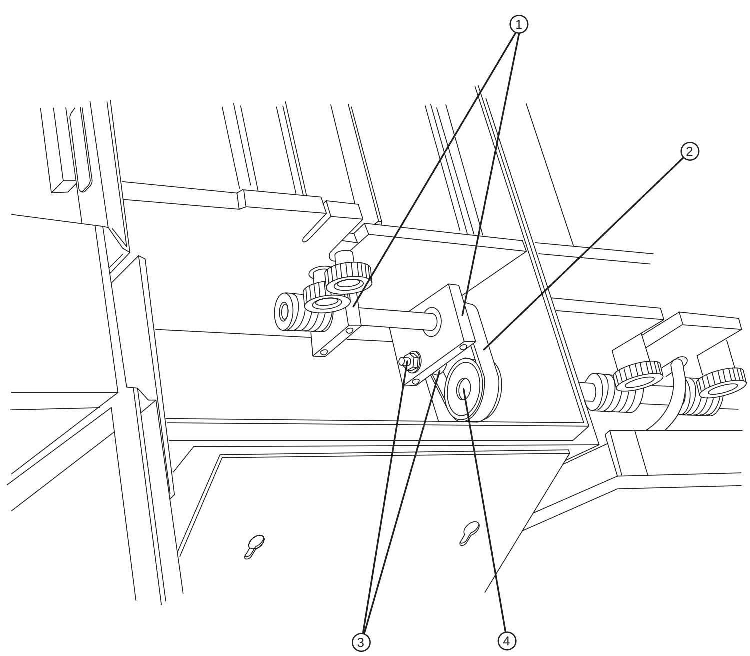


Figure 3-21 Entry rack drive belt assembly.

①–Bearing blocks. ②–Entry drive belt. ③–Entry drive idler. ④–Entry drive pulley.

Replace:

1. Loosen the entry drive idler.
2. Place the new belt over the belt wheel.
3. Reverse Steps 4 and 5 above.
4. Replace the tension belt with idler and tighten.

CAUTION: Do not over tighten the belt.

3.13.2 Drive Shaft

1. Remove the entry rack drive belt. See Section 3.13.1, Drive Belt above.
2. Remove the allen set screw from the belt wheel.
3. Remove all three racks.
4. Loosen the three drive motor mounting bolts to loosen the belt. Slide the belt from the idler, and remove the belt from the drive shaft. Refer to Figure 3-22.

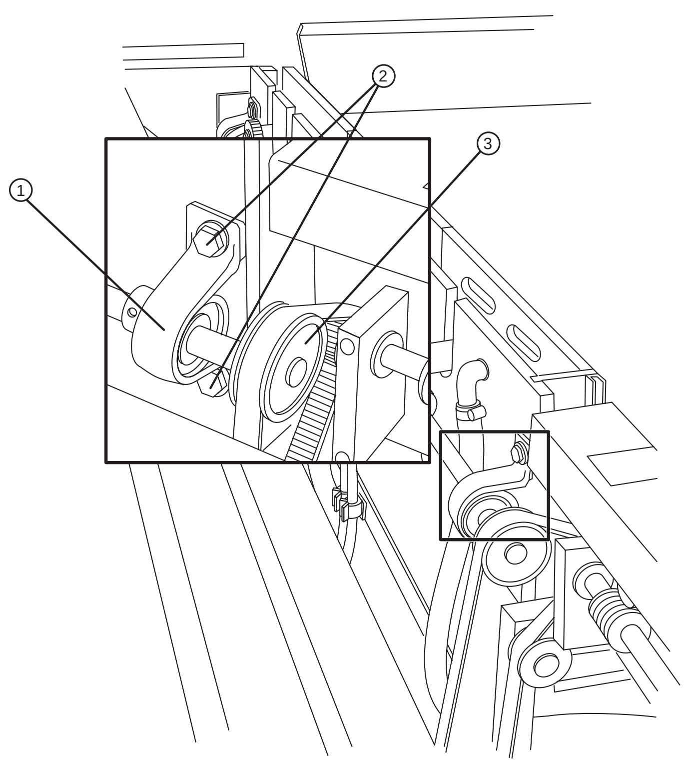


Figure 3-22 Bearing bracket and drive gear.

①–Bearing bracket (front). ②–Bearing bracket bolts. ③–Drive gear with set screw.

5. Remove the allen set screw from the belt wheel. Refer to Figure 3-22.
6. Remove the three (3) J-hooks (two at the center, one at the rear). Refer to Figure 3-23 and Figure 3-24.
7. Using a 10mm wrench, remove the bolts from the three (3) bearing brackets (located at the front, center and rear). Lift the drive shaft back and out. Refer to Figure 3-22, Figure 3-23, and Figure 3-24.

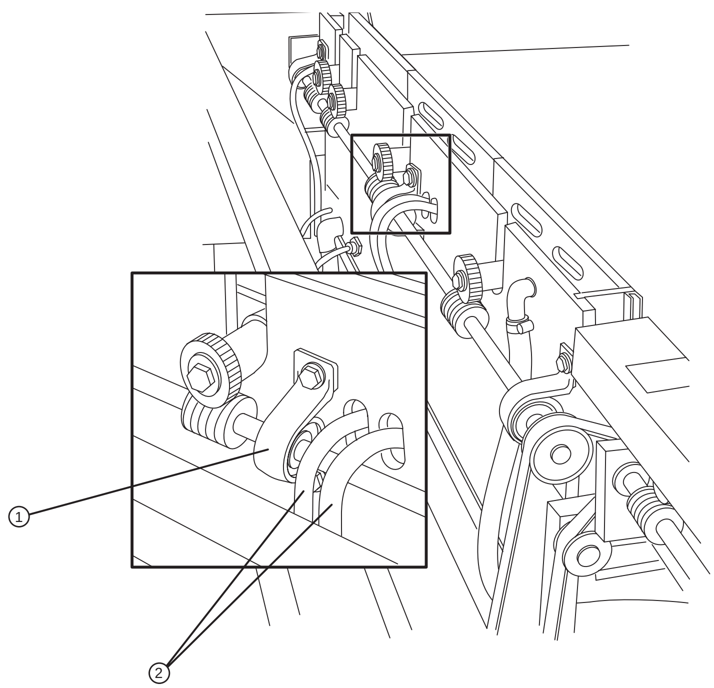


Figure 3-23 Bearing bracket and J-hooks.

①–Bearing bracket (center). ②–Two J-hooks (center).

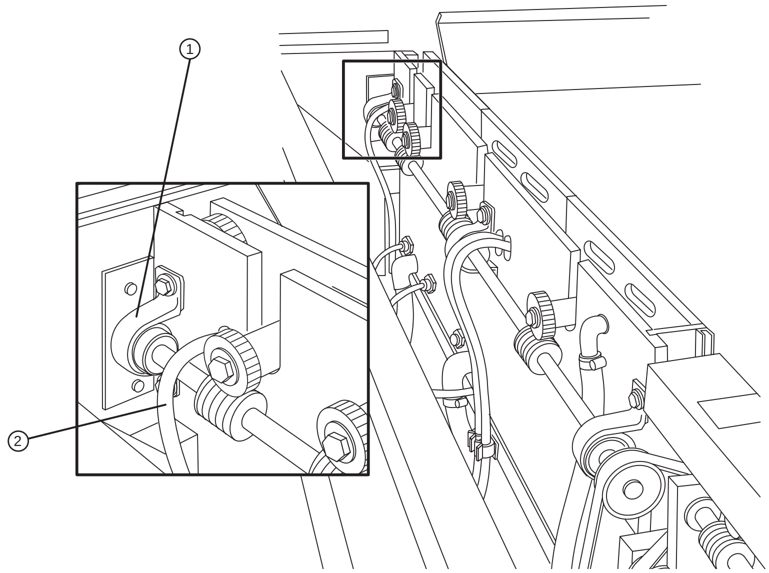


Figure 3-24 Bearing block and J-hook.

①–Bearing bracket (rear). ②–J-hook (rear).

Replace:

1. Reattach the three (3) bearing brackets. Do not tighten the bolts.
2. Replace the racks.
3. Raise the drive at the back and front until the worm gears and drive gears are properly meshed.
4. Check that the fix worm gear is not deflecting the shaft. Adjust as required.
5. Tighten all three bearing bracket bolts.

CAUTION: Do not over tighten bolts. They are easily stripped of their threads.

6. Reverse Steps 1 through 6.
7. Power on the machine to check the drive operation.

Chapter 4:
OLP Maintenance

4.1 Introduction

This chapter provides instructions for maintaining the Avantra 36/44 On-Line Processor (OLP).

This chapter contains information about the following:

- Servicing
  - Checking Sensor Operation
  - Checking Operation of the LCB
  - Checking the Battery
  - Setting the Jumpers
- Calibrating/Jumper Settings
  - LUTH Motor Control Board 24V DC (P/N 5202Y000100)
  - LUTH Motor Control Board 180V DC (P/N 5203Y4000200)
  - Replenishment Pumps Calibration
- Troubleshooting
  - The Service Program
- Service Program Codes
  - How to Use the Repair Method Tables

4.2 Servicing

4.2.1 Checking Sensor Operation

When reading the following procedures, refer to the low voltage wiring diagram.

4.2.1.1 Optical Interrupter

1. Check the +5 V supply. Connect the DVM between P31,4 (common) and P31,2 (+).

   Reading should be 4.75 to 5.25 V DC.

2. Check the supply to the transmitter. Connect the DVM between P31,4 (common) and P 31,3 (supply) of the optical interrupter.

   Reading should be 1.7 to 1.9 DC.

3. Connect the DVM between P31,4 (common) and P31,1 (pulse) of the optical interrupter.

   Reading should range from 12 V (detector gap open) to 0 V (detector gap closed).

4.2.1.2 Film Sensor

1. Check the output. Connect the DVM across the appropriate channel to be checked.

   For SENSOR 4, for example, measure the voltage between X501,15 and X501,2. A non activated sensor should read 0 V, and an activated sensor should read 5 V.

4.2.1.3 Temperature Sensor

Checking the response to the actual temperature is done as a resistance measurement.

1. Switch off the processor.
2. Disconnect the sensor from the circuit.
3. Connect a DVM to the sensor.
4. Use the following (simplified) formula to calculate the correlation between temperature and resistance:

   Resistance (Q) = (temp. [C°] x 1.925) + 500

Checking Temperatures

Below are some examples of the correlation between temperature and resistance:

21°F (-6.1°C) = 540.4 ohm

30°F (-1.1°C) = 557.8 ohm

32°F (0.0°C) = 561.6 ohm

34°F (1.1°C) = 566.5 ohm

35°F (1.7°C) = 569.3 ohm

38°F (3.3°C) = 573.2 ohm

40°F (4.4°C) = 577.0 ohm

42°F (5.6°C) = 580.9 ohm

45°F (7.2°C) = 586.6 ohm

50°F (10.0°C) = 596.3 ohm

55°F (12.8°C) = 605.9 ohm

60°F (15.6°C) = 615.5 ohm

NOTE: If temperatures in the bath are incorrect, no adjustment is possible. The only corrective action available is to replace the defective temperature sensor.

4.2.2 Checking Operation of the LCB

WARNING: All AC power must be off prior to removing the X400 plug.

1. Check the power supply circuits:
   a. Disconnect the X400 plug Agfa Terminal Board (ATB).
      i. Measure the voltage between pins 4 and 5. The nominal value is 18 VAC.
      ii. Measure the voltage between pins 4 and 3. The nominal value is 12 VDC.
      iii. Reconnect the X400 plug.

b. Disconnect the X503 plug (level and feedback).

  i. Measure the voltage between pins 1 and 9. The nominal value is 10 VAC.

  ii. Reconnect the X503 plug.

c. Disconnect the X500 plug (temperature sensors).

  i. Measure the voltage between pins 1 and 6. The nominal value is 5 VDC.

  ii. Reconnect the X500 plug.

4.2.3 Checking the Battery

1. Remove the EMC shield of the LCB before checking the battery.
2. Connect a DVM across the battery terminals.

   The reading should be 3.0 V. If the voltage is lower than 2.5 V, the battery should be replaced. Note that the normal lifetime of the battery is approximately 10 years.

WARNING: Voltage remains in the system even after you turn off the display with the on/off switch. Turn off the main power before opening the electronics box!

4.2.4 Setting the Jumpers

S100	Open	Reset
S104	8*	< 8 K RAM
	32	=> 32 K RAM
S103	96	Current loop baud rate = 9600
	12*	Current loop baud rate = 1200
S101	F	Degrees Fahrenheit (F°)
	C*	Degrees Celsius (C°)
S102	H1•	Not used
	L0	
S105	Closed	Write protection of initial processor data in EEPROM
S400/ S401	Open/Open	
	Sink/Source (current loop transmitter passive or active)	
S402/ S403	Open/Open	
	Sink/Source (current loop receiver passive or active	

* Factory installed positions.

S1	Open*	Triac Q5 controlled from X1 pin 7
	Closed	Triac Q5 and Q6 controlled from X1 pin 7 or X1 pin 12
S2	Open*	Triac Q4 controlled from X7 pin 2
	Closed	Triac Q4 and Q5 controlled from X1 pin 7
S3	Open	Disconnect common of coils from +12V
	Closed*	Connect common of coils to +12V
S4	Open*	Disconnect common of coils from 0V
	Closed	Connect common of coils to 0V
J1/J2	A	Load connected to terminal 6 powered from-phase line F2
	B	Load connected to terminal 8 powered from phase line F3 through K10

J3	A	Trigger circuit for Q5 powered from return line N4
	B	Trigger circuit for Q5 powered from return line N3

* Factory installed positions.

CAUTION: Closing both S3 and S4 will short circuit the 12V power supply.

4.3 Calibrating/Jumper Settings

The procedures in Sections 4.3 and 4.4 require the use of Control Panel keys on the OLP. The examples below detail the two types of keypads. Older Control Panels use Alphabetical keys (Figure 4-1). Newer models use Icons (Figure 4-2).

Refer to these figures when entering key codes from the Control Panel. Both Alphabetical and Icon representation will be given in the procedures.

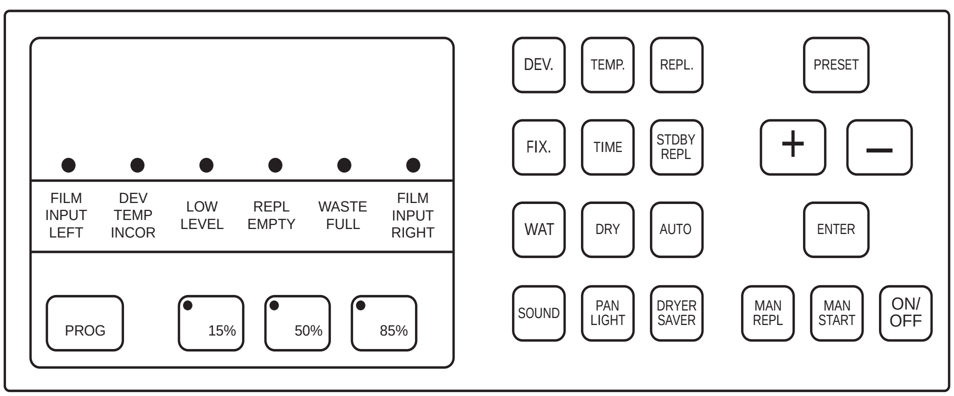


Figure 4-1 Old Control Panel with alphabetical key pad.

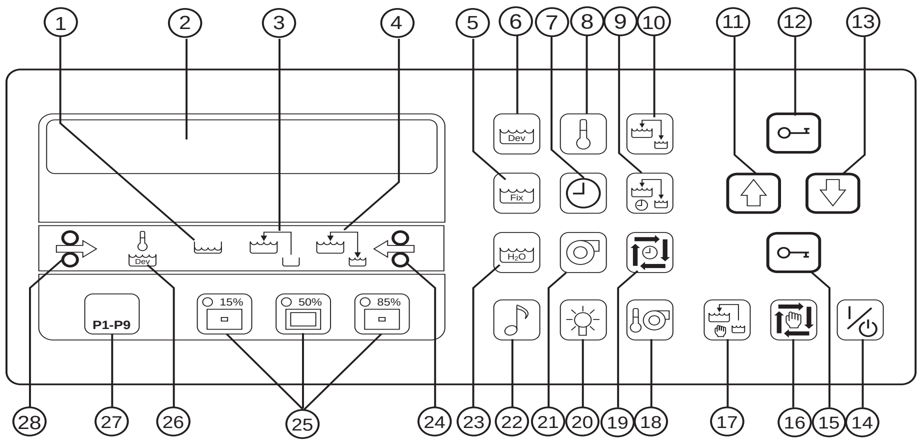


Figure 4-2 New Control Panel with icon key pad
(Descriptions of keys on next page)

OLP Control Panel Icons (for Figure 4-2)

1–Low Dev. or Fix.	8–Temp.	15–Enter	22–Sound
2–Display	9–Stdby Repl.	16–Man. Start	23–Water
3–Low Repl.	10–Repl.	17–Man. Repl.	24–Film Feed Right
4–Waste Full	11–Up	18–Dryer Saver	25–Exposure %
5–Fix.	12–Preset	19–Auto	26–Dev. Temp. Incorr.
6–Dev.	13–Down	20–Panel Light	27–P1-P9
7–Time	14–On/Off	21–Dryer	28–Film Feed Left

4.3.1 LUTH Motor Control Board (LMB) 24V DC (P/N 5202Y000100)

The LMB 24V performs the following functions:

- Amplifies the motor preset value to the corresponding voltage for driving the main motor
- Receiving and converting /R pulse preset values (optical link)
- Receiving and converting tacho feedback pulses

NOTE: The following procedure is for OLPs with serial #3613DD300659 and above. See Section 4.3.2 for calibrating the 180V LMB.

The following procedure calibrates the LMB (refer to Figure 4-3). A shorter remote control panel cable is taped to the top of the electronics box to make the procedure easier.

To Reposition the Control Panel:

1. Remove all power to the processor.

2. Slide the control panel up and remove.
3. Disconnect the control panel cable and take it to the back of the processor.
4. Connect the control panel to the X400 with the remote cable.

WARNING: The PCB has high voltage terminals. Use caution when handling.

CAUTION: Never connect or disconnect the cable when the processor is plugged in, or the CPU fuse will fail.

NOTE: Potentiometer P102, N Min on the LUTH motor board, is not used with infrared pulse transmission.

To Calibrate the LMB:

1. Turn off the processor from the control panel.
2. With the control panel off, enter the service program by pressing the following keys in sequence:

   AUTO

   DRYER SAVER

   +

   TIME

   The display should read:

   Service Code ___.

3. Enter code 112 by pressing the following keys in sequence:

   DEV

   DEV

   FIX

Note: DEV	=	1
FIX	=	2
WAT	=	3

   The display should read:

   ACT 60 PRE 60

   Where ACT = actual motor speed, and PRE = preset motor speed. Change the preset value with the 15% and 85% keys, which decrease and increase the value.

4. When the motor is turning in the wrong direction, switch the motor off immediately by pressing the 50% button on the control panel. Exchange the motor wires M1 and M2.
5. Set the speed to 20 seconds and adjust P203 (N-max.) until 20 ±1 seconds is obtained. To increase the speed, turn P203 clockwise.
6. Set the speed to 50 seconds and adjust P219 (N-min.) until 50 ±2 seconds is obtained. To increase the speed, turn P219 clockwise. Repeat 20 and 50 seconds and readjust, if necessary.
7. Switch the processor to normal operation and make a functional checkout.

NOTE: Remember to reprogram preset values in the control panel.

The motor overload message in the display (only visual in normal mode, not in service mode) appears in this EPROM version as:

Disconnect Mains + Motor Off. The following table shows jumper settings for current limiter cut-out levels:

Jumper Position	Current Limit	Machine Type
10	0.5A	
9	1.0A	
8	1.5A	
7	2.0A	
6	2.5A	Rapiline 43-3, 51-3. 66-3, 72-3
5	3.0A	RL 72 OLP for Dolev, RL 51-3 OLP Accuset, Ecorap 51 & 72
4	3.5A	Avantra 44 P and OLP
3	4.0A	Avantra 44
2	4.5A	
1	5.0A	

Connections:

X1-1/2/4	input optical interruptor
X2	not used
X3-1/2	tacho feedback connected to X503 -B/14 LMB
X4A/B	not used
X102-1	M+ to the drive motor
-2	M- to the drive motor
-3/4	not used
-5/6	24VAC input from transformer

Potentiometers:

N-MIN : Adjustment of minimum speed (R219)

N-MAX. : Adjustment of maximum speed (R203)

I-OFFSET : Adjustment of offset in current amplifier circuit. Factory adjusted and sealed; do not adjust.

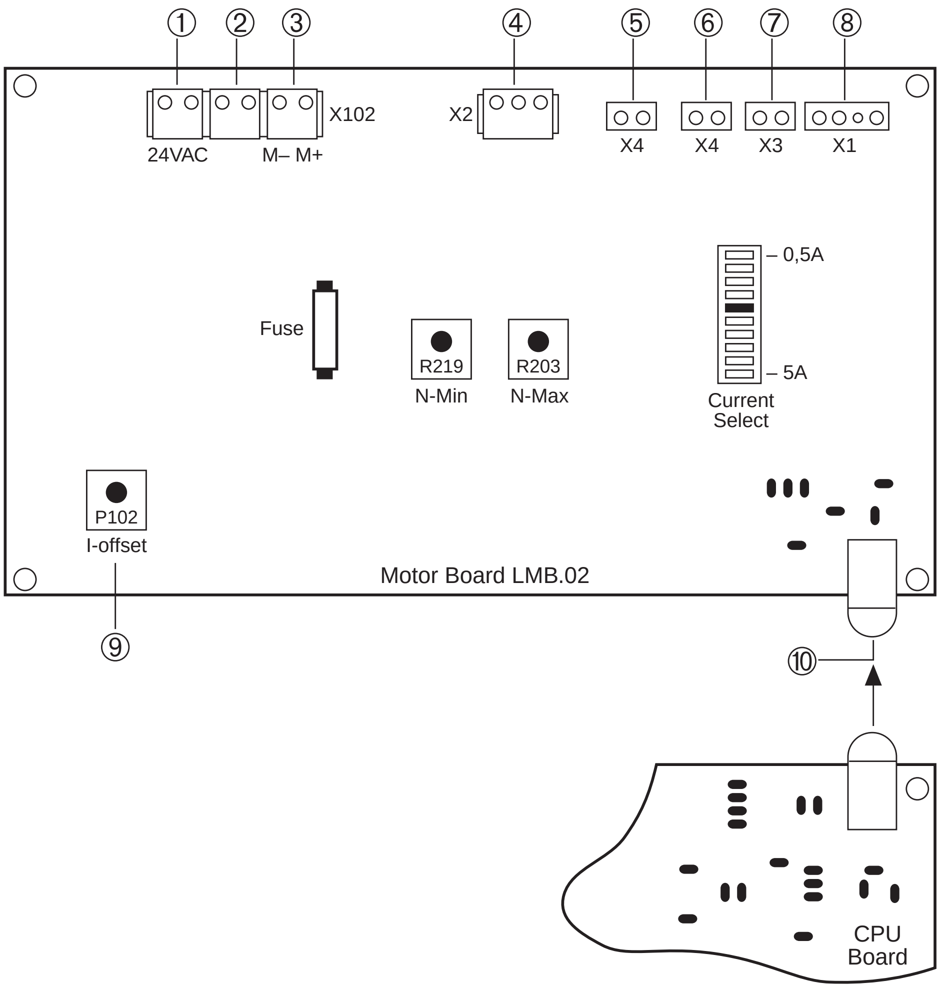
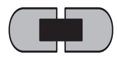
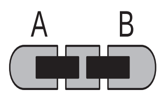
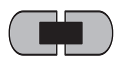
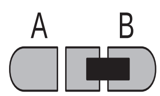


Figure 4-3 LUTH Motor Board (LMB).

①–To secondary transformer (6/5). ②–Not used.
③–To motor. ④–Not used. ⑤–Not used.
⑥–Motor (Pin 1 = M+, Pin 2 = M-) top signal (safety switch).
⑦–Tacho feedback to CPU. ⑧–Optical interrupter.
⑨–Do not change. ⑩–Optical link with CPU board.

The following table shows switch settings. Check the position accuracy of these switches.

X201		OPEN	4-circuit optical interrupter
		u CLOSED	3-circuit optical interrupter
S201		A	Armature voltage feedback
		u AB	Digital tacho + armature feedback
S202		OPEN	Analog input 5V
		u CLOSED	Analog input 10V
S203		A	Analog preset signal
		u B	Infrared PWM preset signal

u = normal; i.e., factory setting

4.3.2 LUTH Motor Control Board (LMB) 180V DC (P/N 5203Y4000200)

NOTE: The following procedure is for OLPs with serial #3613DD300658 and below. Unless previously upgraded to the 24 V DC style motor, see Sectin 4.3.1 for calibrating the 24 V LMB.

The following procedure calibrates the LMB (refer to Figure 4-3). A shorter remote control panel cable is taped to the top of the electronics box to make the procedure easier.

To Reposition the Control Panel:

1. Disconnect the mains (i.e., remove all power to the processor).
2. Slide the control panel up and remove.
3. Disconnect the control panel cable and take it to the back of the processor.
4. Connect the control panel to the X400 with the remote cable.

WARNING: The PCB has high voltage terminals. Use caution when handling.

CAUTION: Never connect or disconnect the cable when the processor is plugged in, or the CPU fuse will fail.

5. Switch on the mains (i.e., restore power to the processor).

4.3.3 Replenishment Pumps Calibration

To Calibrate the Replenishment Pumps:

1. Adjust the replenishment pumps:
   a. Remove the replenishment J hook from the side of the tank (Dev/Fix), and place it in a 1000 ml graduated beaker.
   b. Press the manual replenishment key to remove air from the replenishment hose. You may have to repeat this several times to clear all the air bubbles.
   c. Empty the beaker.
   d. Press the manual replenishment key and check the amount of replenishment released. Repeat several times (minimum of three pulses).
   e. Measure the total amount of replenishment released and divide by the number of times you pressed the replenishment key to obtain an average value. The correct amount should be 100 ml.
2. If the amount released (see 1e above) does not equal 100 ml for either the developer or fixer, you must make the adjustment using the service program. Follow this procedure:
   a. Switch the processor off.
   b. Press the following keys:

      AUTO 

      DRYER SAVER 

      \+ 

      TIME 

   The display should read:

   Service Code ___.

c. To adjust the developer, use program 321. To select the program, press:

WAT

FIX

DEV

Note: DEV = 1

FIX = 2

WAT = 3

The display shows a preset value from 0 to 200%. Average values range from 95% to 105%.

d. Press the 15% key to increase the percentage value and the 85% key to decrease the percentage value. Adjust the value so that the amount of replenisher released will be 100 ml.

e. To adjust the fixer, use program 322. Press:

WAT

FIX

FIX

Note: DEV = 1

FIX = 2

WAT = 3

Repeat Step 2d from this procedure.

NOTE: After a percent change has been made, check the output by entering program 311 for developer or 312 for fix. Pressing the 85% key releases one pulse that should equal 100 ml. If it does not, repeat step 2d.

NOTE: The adjustment range is 0-200%. If you reach a value of 200% and are not getting 100 ml per pulse, it may be necessary to increase the pump stroke. Loosen the nut on the bottom of the pump and move the pump coil assembly toward the spring. Retighten.

f. Press the on/off key to exit the service program.

4.4 Troubleshooting

4.4.1 The Service Program

Among the features of the electronics is a service program containing a number of codes. These codes are listed on succeeding pages, along with the adjustments they control. Each code tests relay output and digital input.

To Run the Service Program:

1. Switch the processor off.
2. Press the following keys in the sequence shown:

   AUTO

   DRYER SAVER

   +

   TIME

   The display should read:

   Service Code ___.

   The service codes are represented by a three-digit number. The keys DEV, FIX, and WAT can be used for choosing this three-digit number.

   NOTE: DEV = 1, FIX = 2, WAT = 3.

   To choose, for instance, code 132, press:

   DEV

   WAT

   FIX

   The display should read:

   Service Code 132

   (This is not the case when a service code is chosen which uses the display).
3. Start the test by pressing the 15% key.
4. Stop the test by pressing the 85% key.
5. Return to the service menu by pressing the 50% key.

6. To end the service program session, press the ON/OFF key.

   When code 321 and 322 (repl. pump adjustment) are selected, the display shows the present percentage (Adjustment Range: 0-200%).

7. Press 15% to increase percentage. Press 85% to decrease percentage.

NOTE: The service program allows more than one test to run at a time. The LED displays only the last code entered.

WARNING: PK7 is always activated with code 232/233.

WARNING: The service program does not automatically invoke safety measures. Be sure to take normal safety precautions when using the program.

WARNING: Never empty the tanks when working with the service program.

4.5 Service Program Codes

Code	Function	Switch Element	15% Key	85% Key
111	Main motor	K 12	Start	Stop
112	Main motor	Speed adjust	Increase	Decrease
113				
121	Circ. pumps	K 11	Start	Stop
122				
123	Solenoid, water	K 10	Open	Close
131	Dev. repl.	K 8	On	Off
132	Fixer repl.	K 9	On	Off
133				
211	Dev. heat LO	Q 1	On	Off
212	Fixer heat LO	Q 3	On	Off
213	Dev. heat HI	Q 5	On	Off
221	Dev. cooling	(Optional)	On	Off
222				
223	Fixer heat HI	K 2	On	Off
231	Dryer heat basic/fan	K 7	On	Off
232	Dryer heat 1/fan	Q 4 + K 7	On	Off (50% key to switch off K 7)
233	Dryer heat 2/fan	Q 6 + K 7	On	Off (50% key to switch off K 7)
311	Dev. repl.	Pump pulses	10 pulses	1 pulse=100ml
312	Fixer repl.	Pump pulses	10 pulses	1pulse= 100ml
313				
321	Dev. repl. pump adjust	K 8 (adj. 0–200%)	+%	–%
322	Fix. repl. pump adjust	K 9 (adj. 0–200%)	+%	–%
323				
		Lamp	**Color**	
331	Warning signals	Dev. temp. incorrect	Red Blinking	Off
		Low level	Red Blinking	Off
		Repl. empty	Red Blinking	Off
		Wasteful	Red Blinking	Off
		Input	**Lamp**	**Color**
332	Sensor read out	Left input sensor set	Film input (left)	Red
		Right input sensor set	Film input (right)	Red
		Exit sensor	Film input (left & right)	Red
333	Display test	All dots shining	Display	Red

Table 4-1 Service program codes.

4.5.1 How to Use the Repair Method Tables

The three tables on the following pages help locate and fix problems that may occur. The following procedure explains how to use these tables:

1. Look for the problem in Table 4-2 below and note the code number.
2. Find the same problem code number in Table 4-3 below and make a note of the numbers listed to the right. These refer to the repair steps in Table 4-4 below.
3. Follow the repair steps in Table 4-4 in the sequence indicated, until the problem is fixed.

WARNING: When the ON/OFF switch on the Rapiline OLP is off, the display is switched off, but there is still voltage in the system. Turn off the main power before opening the electronics box!

4.5.1.1 Problem Codes

1.0 When Switching On Main Power

1.1 No display information.

1.2 No LED indicators turned on.

1.3 No fan motor.
(After switching on at the control panel.)

2.0 developer Bath

2.1 Temperature in bath too high compared to preset.

2.2 Temperature in bath too low compared to preset.

2.3 Temperature increases too slowly.

2.4 Temperature correct but displayed temperature does not correspond to thermometer reading.

2.5 Bath temperature fluctuates even though setting has not been changed.

3.0 Fixer Bath

3.1 Temperature in bath too high compared to preset.

3.2 Temperature in bath too low compared to preset.

3.3 Bath temperature fluctuates even though setting has not been changed.

4.0 Dryer Temperature

4.1 Temperature of exit air too high compared to preset.

4.2 Temperature of exit air too low compared to preset.

4.3 Dryer fan does not stop when film runs out.

4.4 Dryer fan does not start when the processor is in operation mode.

4.5 Temperature fluctuates even though setting has not been changed.

5.0 Replenishment

5.1 Replenishment pump relays are activated but no replenishment is pumped.

5.2 Wrong amount of developer or fixer replenishment is pumped compared to usage and preset amount.

5.3 Wrong oxy. replenishment compared to preset.

5.4 Wrong Agfastar timer replenishment compared to preset.

6.0 Main Motor and LUTH Motor Board

6.1 Motor does not run.

6.2 Motor consistently runs at high speed.

6.3 Fuses on PCB blow immediately when power is turned on.

6.4 Motor fluctuates in speed.

6.5 Incorrect developer time.

Table 4-2 Problem codes.

7.0 Water Solenoid Valve

7.1 Water solenoid valve is activated constantly.

7.2 Water solenoid valve is never activated.

7.3 Incorrect water flow.

8.0 Circulation Pumps

8.1 Circulation pumps are constantly active.

8.2 Pumps are never active.

9.0 Film Input

9.1 Film input constantly active and film input LED lights constantly.

9.2 Film input sensor activated, LEDs on, but main motor/rollers are okay.

10.0 Low Level

10.1 Low level LED is on even though level is not low.

10.2 Low level LED does not light even though level is low.

10.3 Main motor, dryer fan, etc. start even though low level appears.

11.0 Replenish Empty

11.1 Replenishment empty LED is flashing even though replenisher containers are not empty.

11.2 Replenishment empty LED does not light even though replenisher containers are empty.

12.0 Jog Mode

12.1 Jog mode does not activate main motor and circulator pumps within 5 minutes.

13.0 Display Readout

13.1 0° C. or 70° C. (or more) indicated as DEV.–FIX. or DRY. TEMP.

13.2 Message MOTOR OVERLOAD or MOTOR OFF–DiSCONNECT MAINS.

13.3 Message 2001H.

13.4 Messages 2002H, 2003H, or 2004H.

13.5 Messages: JOB IN PROCES, INPUT JAM, EXIT JAM, MANUAL START.

Table 4-2 Problem codes (continued from previous page).

4.5.1.2 Troubleshooting Diagram

Problem Code	Repair Steps (Refer to Table 4-Table 4-2) 1	2	3	4	5	6	7	8	9
1.1	14	01	03						
1.2	44	60							
1.3	02	01							
2.1	35	37	21	48	06				
2.2	14	35	37	02	09	04	47		
2.3	14	35	37	15					
2.4	04	05							
2.5	04	05	07	06					
3.1	36	21	48	06					
3.2	14	36	02	09	47				
3.3	04	05	07	06					
4.1	39	40	41	08	21	48			
4.2	14	39	40	41	47	04	05	15	
4.3	12	10	11	23					
4.4	39	14	09	45	24	25			
4.5	08	04	05	07	06				
5.1	42	43	13	53					
5.2	42	43	53	54					
5.3	49	50	54						
5.4	65	49	50	54					
6.1	30	26	66	67	18	17			
6.2	30	16	18						
6.3	19								
6.4	55	67							
6.5	56	67							
7.1	32	22	20						
7.2	32	24							
7.3	32	57	58						
8.1	31	20							
8.2	31	24							
9.1	12	27	59	28	59				
9.2	30	26	24	67					
10.1	44	07	51						
10.2	44	07	61	06					
10.3	44	07	61	06					
11.1	44	53	52	07					
11.2	44	52	06						
12.1	49	50							
13.1	05	04	06	09					
13.2	62	63	10	11					
13.3	68								
13.4	69								
13.5	70								

Table 4-3 Troubleshooting diagram.

4.5.1.3 Repair Steps

01. Measure 220/240 V. AC to GND. If voltage is not 220/240 V., check fuse F1 on LPB. Replace defective fuses.

02. Measure 12 V. DC voltage at X3,3(+) and X3,4(-) of LPB. If voltage is not 12 V., check that there is 10 V. AC at X3,1 and 3,2 of LPB.

03. Measure 18 V. AC voltage at X400 plug between pins 4 and 5. If voltage is not 18 V., check fuse F1 on LCB. Replace defective fuses.

04. Check response of temperature sensor. Replace temperature sensor if necessary.

05. Check temperature sensor wiring and plug for continuity; i.e., no open or short circuits.

06. A/D converter failure. Replace LCB PCB.

07. Check all low voltage for short circuits to chassis of machine or ground.

08. Temperature sensor not in proper mechanical position.

09. Temperature sensor not connected.

10. No feedback pulses from optical interrupter. Check function.

11. Align optical interrupter properly.

12. Input sensor electrical or mechanical defect. Activated signal constantly transmitted. Verify with service code 332.

13. Diode (D1 or D2) on LPB board defective.

14. Check main fuses and replace any that are defective.

15. Heating wire inside heating element is broken.

16. Check voltage between terminals 8 and 9 (common). It should be negative. If it is not, check tacho generator or feedback resistor. Check jumper S201.

17. +12 or -12 V. missing on PCB. Replace LMB.

18. One thyristor (SCR) short circuit.

19. Short circuit on both thyristors. Replace PCB.

20. Relay contact melted.

21. Power triac short circuit.

22. R-C network (mounted across relay contacts) in bad condition.

23. Check optical interrupter wiring and plugs for continuity; i.e., no open or short circuits.

24. Relay defective.

25. Check appropriate wiring and terminal strips.

26. Check fuses on Luth Motor Board and replace any that are defective. If fuses continue to blow, replace board and OHM motor. Motor should be 60–80 Ωs.

27. Plug on input sensor not in correct position.

Table 4-4 Repair steps.

28. Check internal wiring between X501 plug and input sensors.
29. Check that circulation pumps are running during heating.
30. Verify operation of electronic system with service code 111.
31. Verify operation of electronic system with service code 121.
32. Verify operation of electronic system with service code 123.
33. Verify operation of electronic system with service code 131.
34. Verify operation of electronic system with service code 132.
35. Verify operation of electronic system with service code 211.
36. Verify operation of electronic system with service code 212.
37. Verify operation of electronic system with service code 213.
38. Verify operation of electronic system with service code 221.
39. Verify operation of electronic system with service code 231.
40. Verify operation of electronic system with service code 232.
41. Verify operation of electronic system with service code 233.
42. Verify operation of electronic system with service code 311.
43. Verify operation of electronic system with service code 312.
44. Verify operation of electronic system with service code 331.
45. Blower capacitor defective. Replace.
46. Verify operation of electronic system with service code 333.
47. Built-in thermo fuse in heating element is open.
48. Incorrect trigger signal to power triac. Replace trigger board.
49. Time not adjusted on ATB. Insert correct time.
50. Clock not working due to battery failure. Check readout over a period of time. Check battery. Connect a DVM across the terminals. Normal reading should be 3.0 V. If voltage is lower than 2.5 V., battery should be replaced. Note that normal life span is approximately 10 years.
51. Check quality of each connection between developer heating element and fixer heating element.
52. Check replenishment empty sensor wiring and plugs for continuity; i.e., no open or short circuits. Check that the sensors are not set so low as to come in contact with the bottom of the replenishment tank.
53. Replenishment tubes not in proper position in replenishment container, or replenishment container is empty.
54. Recalibrate pumps using MAN REPL key. See Service Program.
55. Check length of brushes.
56. Adjust LMB as described in the LMB Calibration Procedure in Section 4.3 on page 4-6.
57. Check flow control at water solenoid valve inlet.

Table 4-4 Repair steps (continued from previous page).

58. Check water inlet all the way from water tap to the wash section.
59. Check alignment of suspension for input sensors and sufficient room for wiring.
60. Agfa Light Diode Board (ALB) is not in proper position.
61. Clean area around low level sensors for chemistry.
62. Adjust racks as described in the Installation Checkout Procedure in Chapter 1.
63. Adjust LMB as described in the LMB calibration procedure Section 4.3 on page 4-6.
64. Blank.
65. Check that Agfastar is selected (A* displayed?).
66. Check that preset speed signal is present. Measure voltage across terminals 9 (ground) and 13 (preset positive voltage).
67. Infrared receiver on LMB is not in proper optical sight with infrared transmitter on LCB. Align the optical components.
68. In the SW all inputs have an attached byte which is coded with a letter for actual use:

    T = Temperature input.

    D = Digital input.

    L = Level input.

    N = Not used.

    If the SW detects a signal that does not correspond to the table above, a 2001H error is displayed. The error is caused by poor or defective Random Access Memory (RAM) .

    Replace the LCB.
69. A/D conversion not finished within specified time. Time-out flag set. Caused by internal power supply breakdown; i.e., -5 V. ref. for A/D converter is missing or 12 V is missing.

    Replace LCB board.

NOTE: If a 2002–2004H error is flashing, the temperature sensors (DEV, FIX, and DRY) should be checked for short circuits before replacing the LCB.

70. Refer to the OLP Status and Error Messages in Section 4.5.1.5 on page 4-25.

Table 4-4 Repair steps (continued from previous page).

4.5.1.4 Switches and Sensors

Figure 4-4 shows the locations of switches and sensors in the OLP, as well as the imagesetter and buffer. Use with status and error messages.

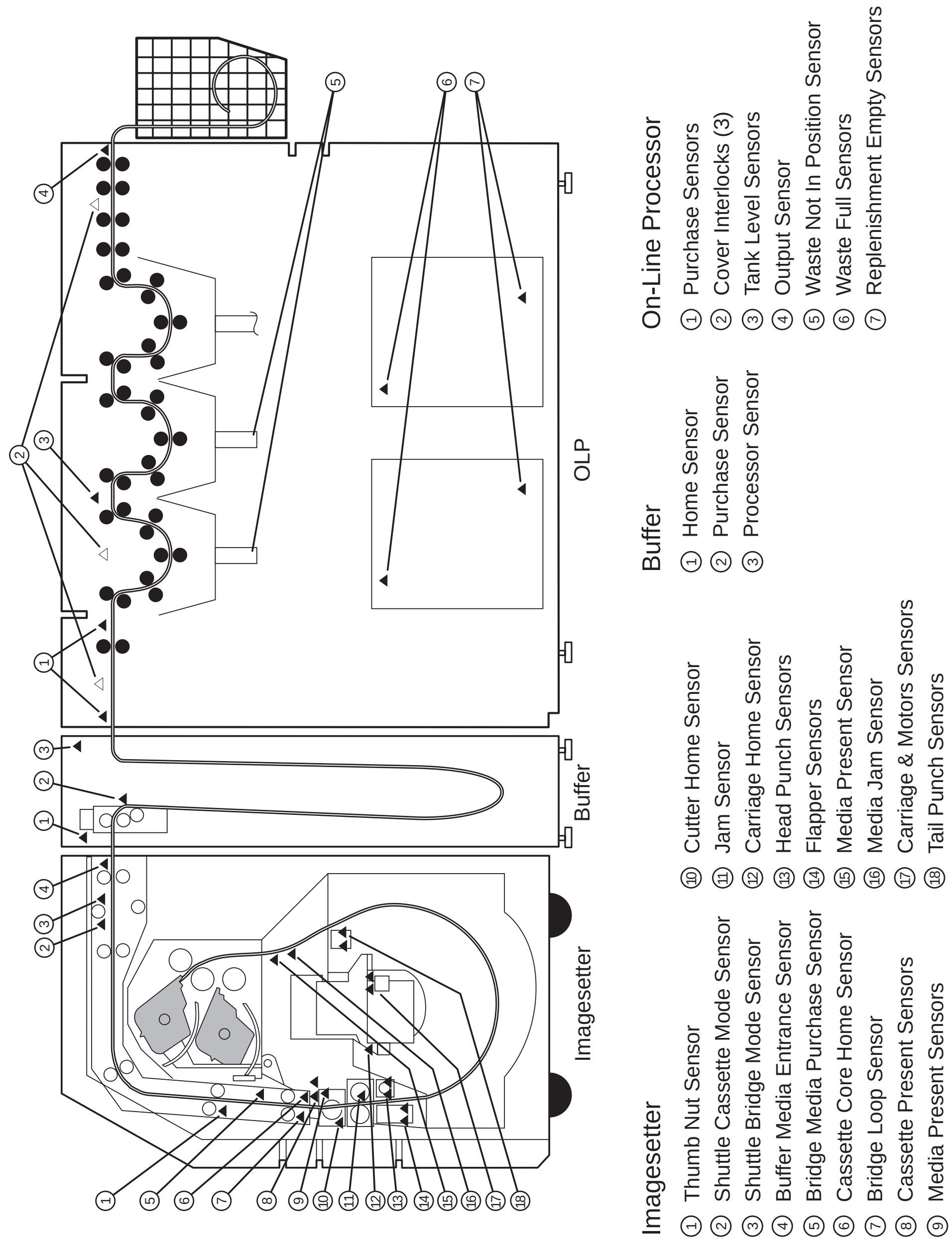


Figure 4-4 Switches and sensors.

4.5.1.5 OLP Status and Error Messages

The following status and error messages are displayed at the OLP control panel.

Job in Process

Meaning: Media is currently in the processor and no new job has started imaging since the last piece of media entered the processor.

Action: No action required. Status message only.

Input Jam

Meaning: Media activated the input sensors of the processor, but did not reach the input out sensors in the given amount of time.

Action: Check the processor input rollers for a possible media jam.

Exit Jam

Meaning: Material has entered the processor, but did not reach the processor exit sensor in the given amount of time.

Action: Check processor for possible media jam. Check that the media keeps the exit sensor active when entering the receiving basket. Lower the sensor mounting bracket or raise the lower platen as needed.

Motor Overload (Or Disconnect Mains + Motor OFF)

Meaning: The processor has detected an error in the transport drive system.

Action: Inspect the processor for possible media jam, damaged gears, or binding drive system. Check that the door and dryer interlocks are fully engaged. Disconnect and reconnect the mains (power) to the OLP to clear the error. If the error persists, refer to the troubleshooting tables: Table 12-5, 12-6 and 12-7. If 24V DC drive motor is present, check the jumper setting for current limiter.

Manual Start

Meaning: The manual start key on the control panel has been activated.

Action: As soon as the manual start key is pressed again, the message disappears.

Appendix A:

Specifications

A.1 Introduction

This section details pertinent technical equipment specifications for the Avantra 36/44 on-line processor (OLP)

A.2 On-line Processor (OLP) Specifications

This section includes the following OLP specifications:

- Physical
- Electrical
- Operational

Physical Specifications

Length:	66" (167.64 cm) excluding receiver tray 98" (248.92 cm) including receiver tray, roll mat. 120" (304.80 cm) including receiver tray, sheet mat.
Width:	61" (154.94 cm)
Height:	54" (137.16 cm) with stand
Net Weight:	937 lbs. (425.02 kg)
Operating Weight:	1136 lbs. (515.28 kg)

Electrical

Volts:	208-240 VAC
Hertz:	50/60 Hz
Phases:	1, 2 or 3 phases + (neutral) + ground
Load:	Maximum 7.0 kW

Operational Specifications

Water connection:	3/4" BSP (0.3-10 bar, max. temp. 110˚ [43˚C])
Drain:	5.3 US Gal. (3 x Ø25 mm, 3 x 20 L/min)
Water consumption:	0.5 US Gal. (0-2 L/min)
Tank capacity:	
Developer:	8 US Gal. (30.3L)
Fixer:	8 US Gal. (30.3L)
Water:	8 US Gal. (30.3L)
Temperature range:	
Developer:	74°-110° F (23°-43° C)
Fixer:	74°-110° F (23°-43° C)
Temperature settings, dryer:	86°-140° F (30°-60° C)
Material width:	Max 37.4" (95 cm) Min 4" (10.16 cm)

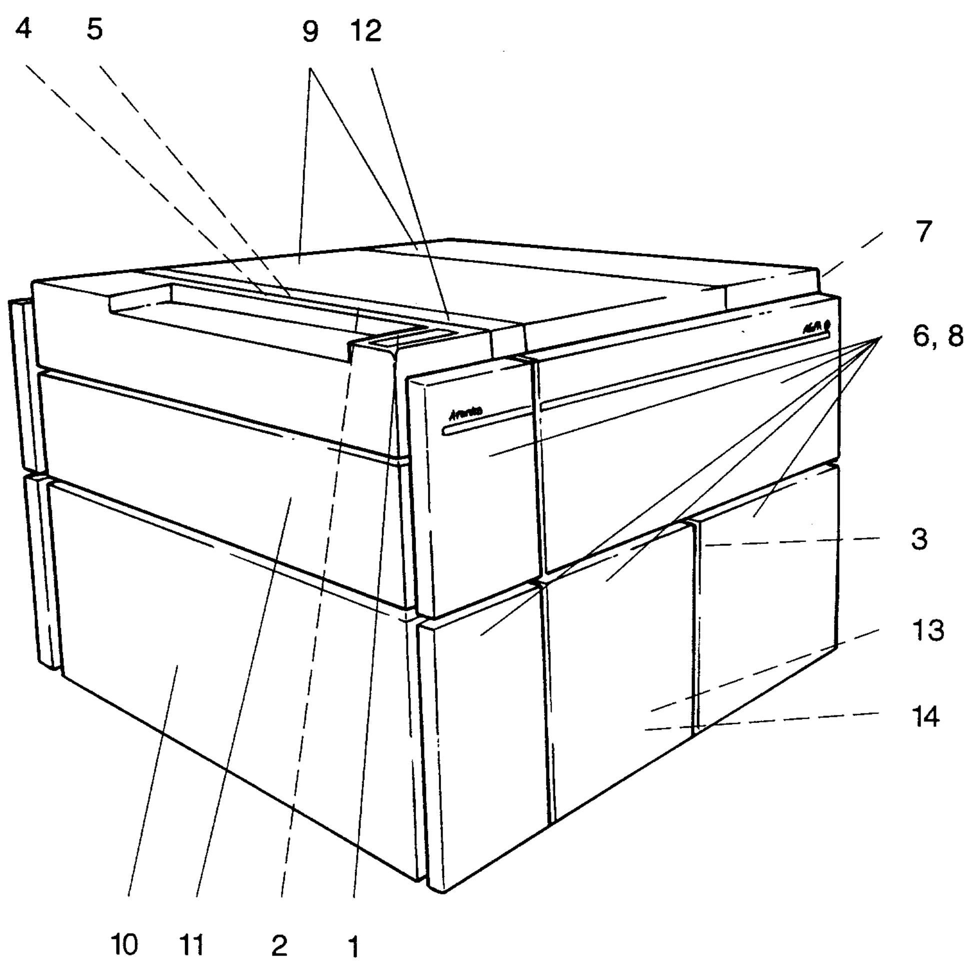
Material length:	Min 7" (17.78 cm)
Transport length:	
Developer:	16.5" (41.91 cm)
Fixer:	16.5" (41.91 cm)
Wash:	16.5" (41.91 cm)
Dryer:	19" (48.26 cm)
Developing time range:	15-60 sec
Speed range:	66-16.5"
Dry to dry time: (at 20 sec dev time)	83 sec
Developer repl rate:	50-500cc/m^2
Fixer repl rate:	50-500cc/m^2
Max dryer blower capacity:	21894 Ft^3 (620 m^3/hour)
Max anti-cond. capacity:	1695 Ft^3 (48 $m^{3/hour}$)

Appendix B
Spare Parts

On-Line Processor (OLP)

The following lists and illustrates spare parts for the 36/44 P and OLP.

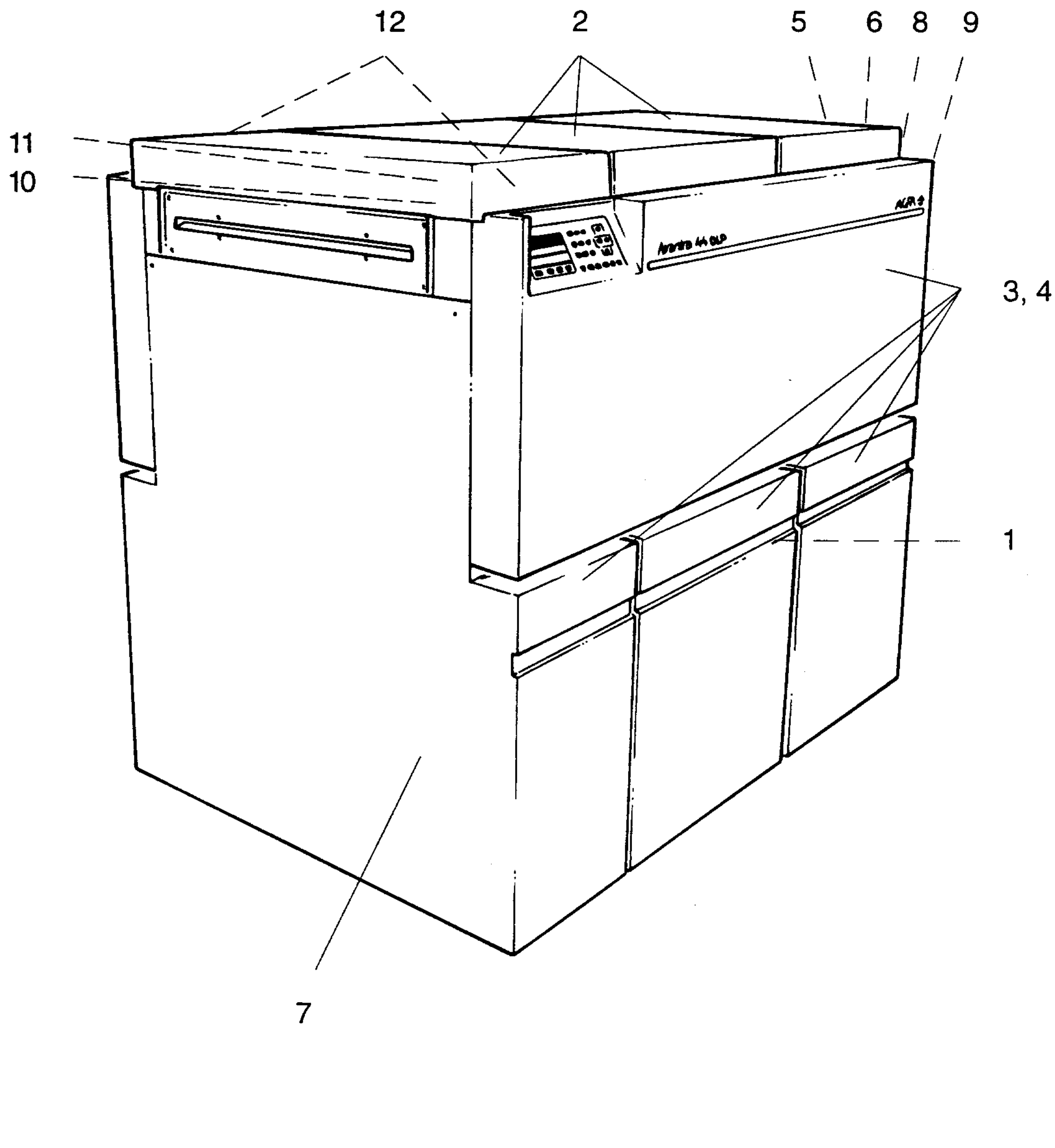
Avantra 36/44 OLP Parts



Avantra 36/44 OLP Parts List

1	LU+0510Y013100	Control panel complete (P version)
	LU+0507Y013101	Control panel complete (OLP version)
2	LU+2621Y001001	Keyboard cable 2.75 m (P version)
	LU+2621Y001006	Keyboard cable 3.00 m (OLP version)
3	LU+6203X000800	Magnetic lock
4	LU+1451X000100	Paper path sensor
5	LU+2621Y011001	Wiring hamess l/P sensors (P version)
	LU+2621Y010901	Wiring harness l/P sensors (OLP version)
6	LU+3621E290144	Side plate, left, upper
	LU+3621E291440	Side plate, left, upper, front
	LU+3621E290840	Side plate, left, lower, front
	LU+3621E290940	Side plate, left, rear, lower
7	LU+3621E291040	Side plate, rear, lower
	LU+3601E290140	Side plate, rear, upper
8	LU+3621E290244	Side plate, right, upper
	LU+3621E291340	Side plate, right, upper, front
	LU+3621E290540	Side plate, front, right lower
	LU+3621E290640	Side plate, middle, right, lower
	LU+3621E290740	Side plate, rear, right, lower
9	LU+3621E292142	Top cover, rear
	LU+3621E292042	Top cover middle
10	LU+3621E290440	Front plate
11	LU+3621E300140	Cassette
12	LU+3621E300342	Cover plate for I/P sensors
13	LU+3601E600200	Drip tray, left
	LU+3601E600300	Drip tray, right
14	LU+3615D600200	Chemicar cpl.
15	LU+3601E290715	Film basket, comp.

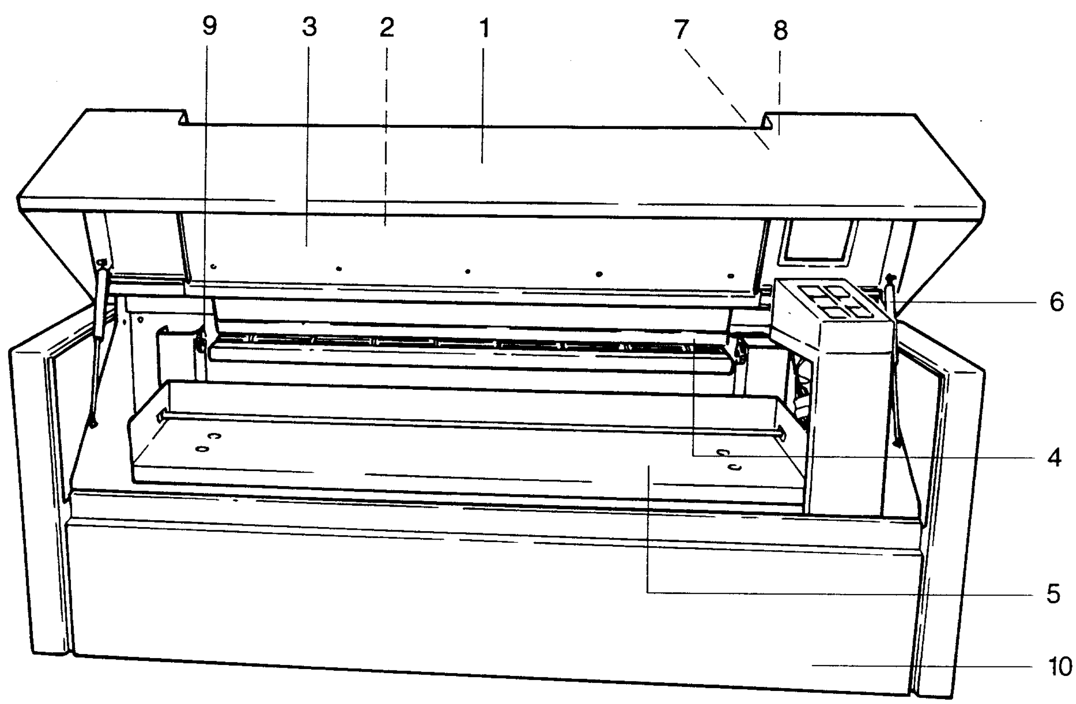
Avantra 36/44 OLP Parts



Avantra 36/44 OLP Parts List

1	LU+6203X000800	Magnetic lock
2	LU+3611E291842	Top cover, rear
	LU+3611E291942	Top cover, middle
	LU+3611E290342	Top cover, front
3	LU+3611E290244	Side plate, right, upper
	LU+3611E290540	Side plate, right, front, lower
	LU+3611E290640	Side plate, right, middle, lower
	LU+3611E290740	Side plate, right, rear, lower
4	LU+3611E290144	Side plate, left, upper
	LU+3611E290840	Side plate, front, left lower
	LU+3611E290940	Side plate, rear, left, lower
5	LU+3601E290715	Film basket, comp.
6	LU+3601E290140	Side plate, rear, upper
	LU+3611E291040	Side plate, rear, lower
7	LU+3611E290400	Front plate
8	LU+2601Y010201	Wiring harness output sensor
9	LU+1451X000100	Jam sensor
10	LU+1441X000300	Reed switch
11	LU+1442X000100	Magnet for red switch
12	LU+2211X000100	Safety switch, front box

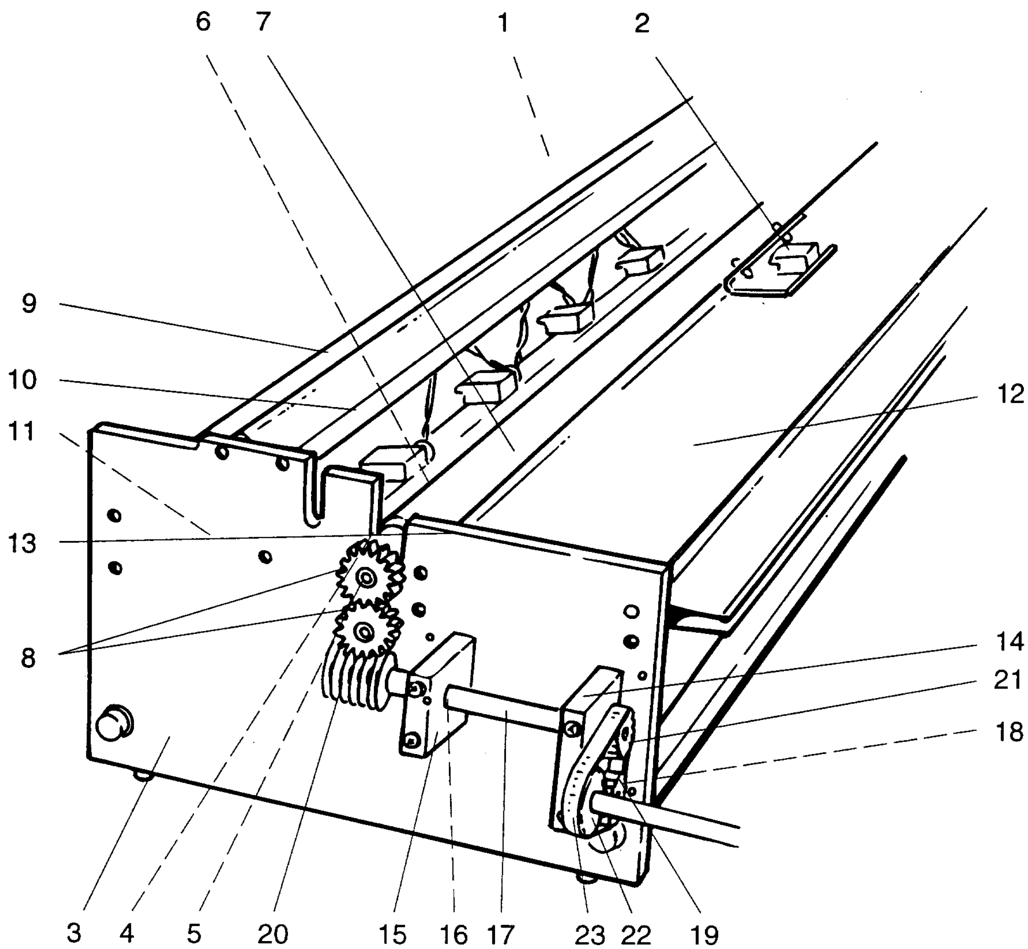
Avantra 36/44 OLP Cassette Parts



Avantra 36/44 OLP Cassette Parts List

1	LU+3621E300242	Cassette cover
2	LU+3621E300742	Feed table upper
3	LU+3621E300602	Feed table lower
4	LU+3621E301134	Stop bar
5	LU+3621E300834	Bottom plate for cassette
6	LU+6221X000203	Gas damper for cassette cover
7	LU+6221X000102	Gas damper for feed table
8	LU+1351Z060401	Slide bearing Ø6/Ø4 x 4
9	LU+1201Z201505	Gear wheel
10	LU+3621E300142	Cassette bottom

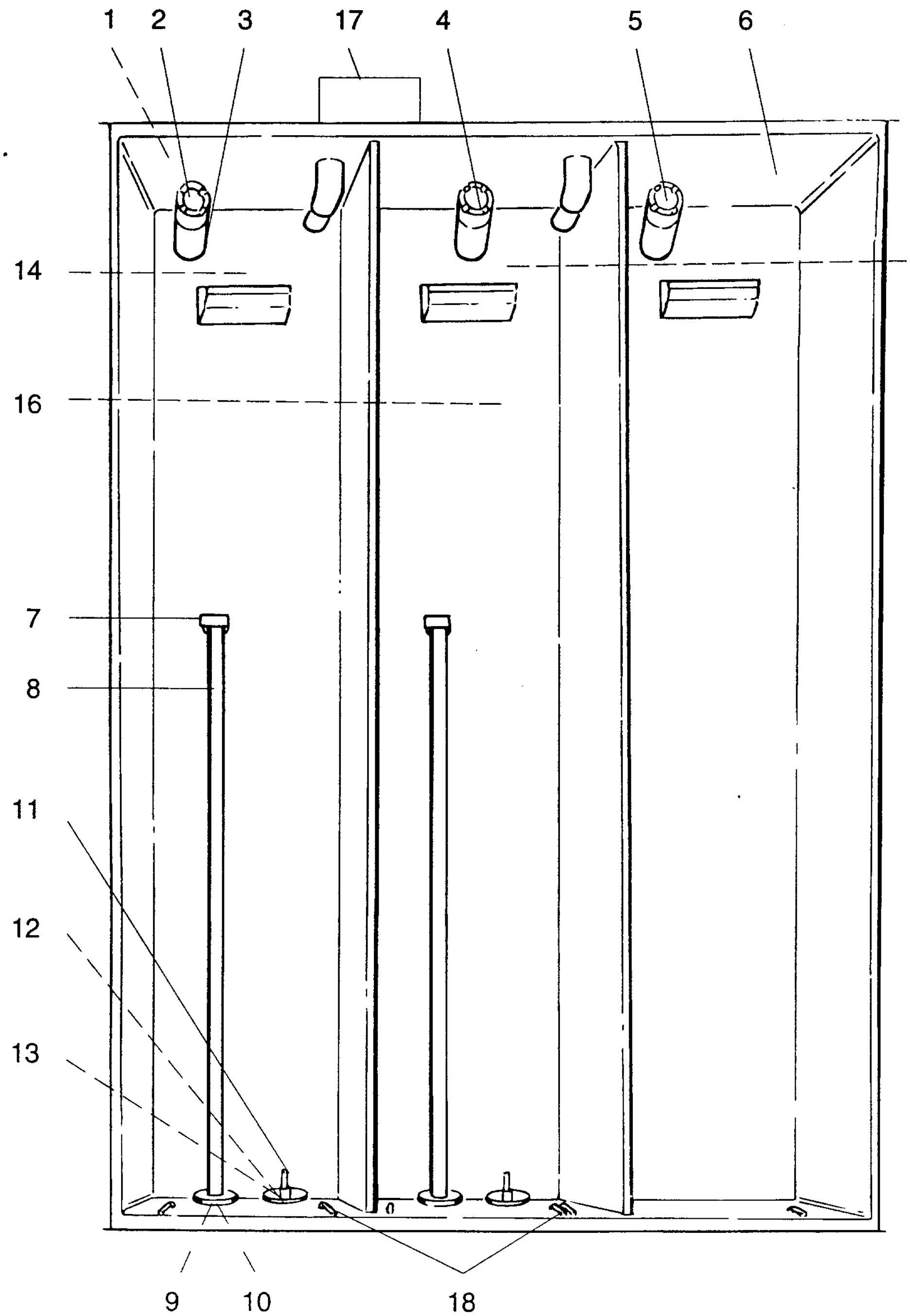
Avantra 36/44 OLP Feed Rack Parts



Avantra 36/44 OLP Feed Rack Parts List

1	LU+3611E300234	Cover for frontbox
2	LU+1451X000100	Paper path sensor
3	LU+3022Z000701	Side plate (left and right)
4	LU+1351Z000501	Bearing for roller PBTP (upper)
5	LU+1351Z000101	Bearing reamed to 10.2mm
6	LU+1410Z041404	Rubber roller Ø25.0 15/35 (lower)
7	LU+1414Z241404	Heavy roller Ø25.0 15/35
8	LU+1282Z161501	Gear M = 1.5/Z = 16/Ø10H7
9	LU+3611E710100	Guide, 91mm FB
10	LU+3611E710200	Curved guide, FB
11	LU+3611E710300	Guide, 132mm FB
12	LU+3611E710400	Guide, 135mm FB
13	LU+2131Z000103	Spring for guide
14	LU+1361Z004701	Bearing block, front
15	LU+1361Z004601	Bearing block, rear
16	LU+1351Z000101	Bearing, reamed to 10.2mm
17	LU+1301Z000805	Drive shaft
18	LU+1331Z000104	Bushing Ø6/Ø10 x 16
19	LU+1253Z160502	Tension roller
20	LU+1221Z011503	Worm for drive shaft
21	LU+1252Z200501	Drive belt pulley
22	LU+1252Z240502	Drive belt pulley
23	LU+6101X000400	Belt

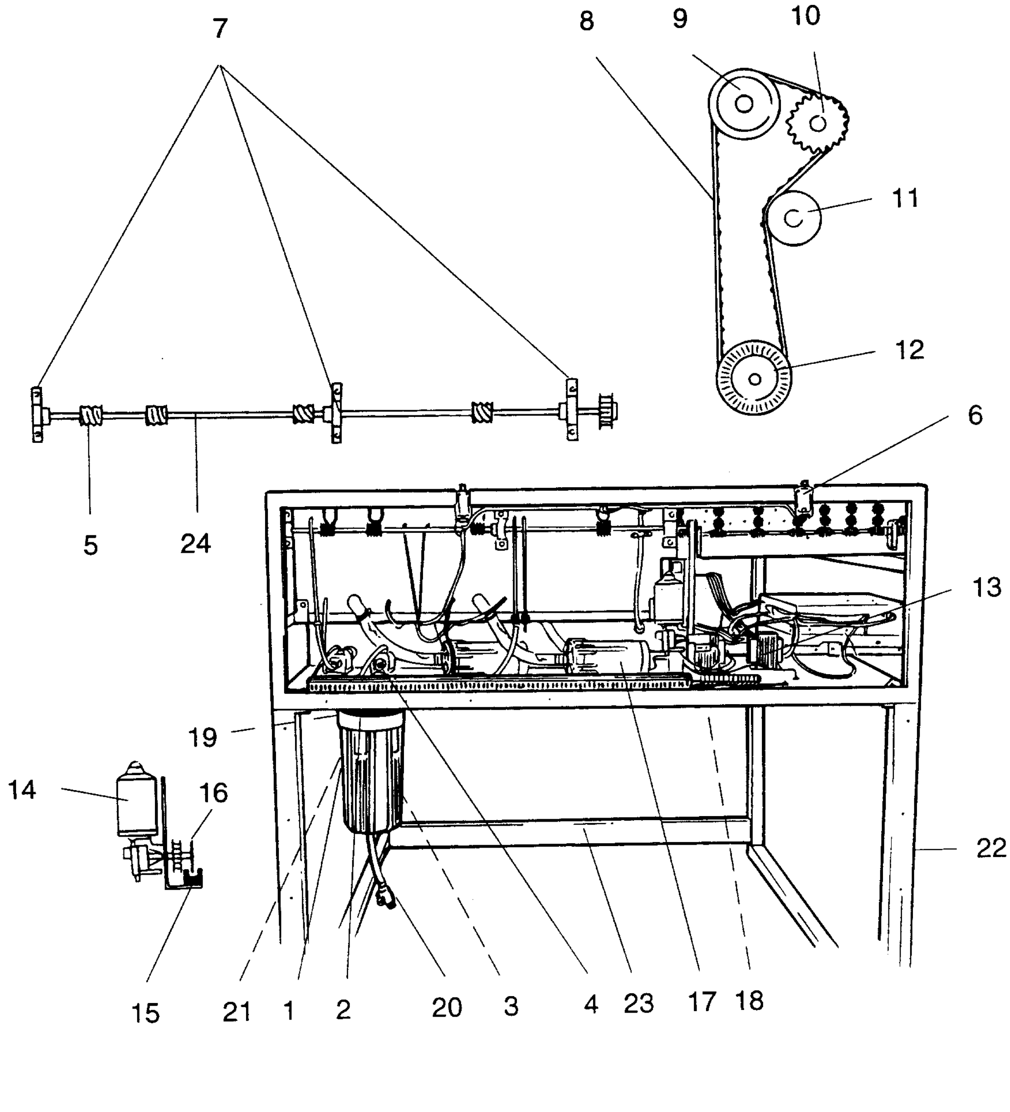
Avantra 36/44 OLP Tank Parts



Avantra 36/44 OLP Tank Parts List

1	LU+3219Z000101	Key for overflow pipes
2	LU+3201Z321901	Overflow pipe, dev.
3	LU+8181X000800	O-ring 19.2 x 3.0
4	LU+3202Z321901	Overflow pipe, fixer
5	LU+3203Z321901	Overflow pipe, wash
6	LU+3601E120100	Tank with fittings
7	LU+3041Z000101	Fixation block for heater element dev + fix tank
8	LU+2201Y000201	Heater element 1000/500 W 230 V dev + fix tank
9	LU+3230Z000401	Union nut Ø16.3 for heater element
10	LU+8181X000700	O-ring 15.88 x 2.62 for heater element
11	LU+2101Y000301	Temperature sensor PT 500 dev + fix tank
12	LU+8181X000200	O-ring 7.3 x 2.4, nitril for PT 500
13	LU+3230Z000301	Union nut Ø8.1 for PT 500
14	LU+3031Z001301	Lid for drain, red
15	LU+3032Z001301	Lid for drain, blue
16	LU+3601E120300	Cover for dev & fix tank
17	LU+2304Y000101	Fan with wiring
18	LU+2301Y000101	Level sensor
	LU+3601E600100	Drip tray for racks (NOT SHOWN)

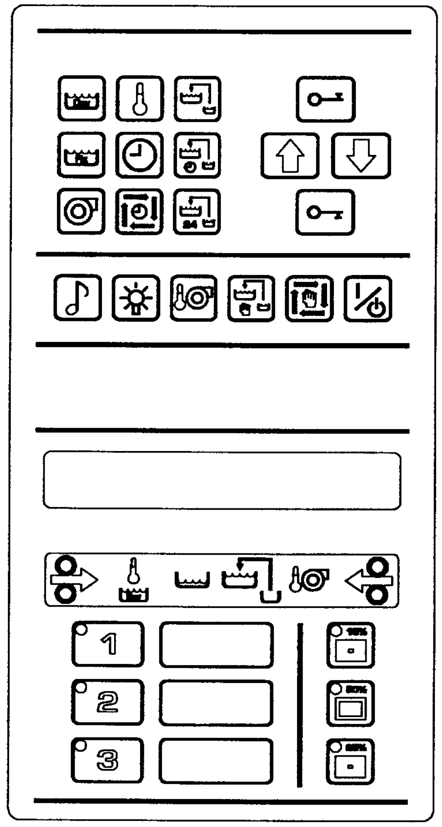
Avantra 36/44 OLP Right Side View Parts



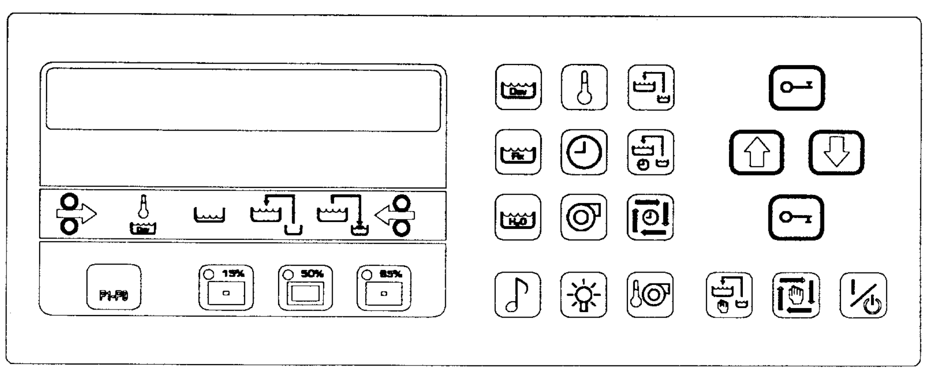
Avantra 36/44 OLP Right Side View Parts List

1	LU+6900X000500	Filter housing complete
2	LU+8181X001600	O-ring 98.02 x 3.50
3	LU+6909X000700	Cartridge
4	LU+0201X000801	Replenish pump for dev + fix
5	LU+1221Z010201	Worm
6	LU+2211X000200	Safety door switch
7	LU+6311X000200	Bearing
8	LU+6101X001200	Drive belt 10T5, L=630mm
9	LU+1252Z240502	Drive belt pulley
10	LU+1251Z200501	Drive belt pulley T5/21/20 without flange
11	LU+1241Z000102	Tension roller
12	LU+1252Z270501	Drive belt pulley T5/21/27
13	LU+1501X000600	Transformer
14	LU+0104X000500	Motor 24 V
15	LU+1461X000200	Opto interruptor
16	LU+1462X000200	Slotted disc 60 holes
17	LU+0201X000301	Circulation pump for dev + fix
18	LU+3230Z002801	Pipe for repl., Ø10/Ø7
19	LU+7341X252001	Ball valve,1 V311250, Ø25
20	LU+7342X121221	Valve
21	LU+2701	Wrench for filter
22	LU+3621E310000	Stand complete (P version)
	LU+3611E310000	Stand complete (OLP version)
23	LU+3601E310240	Cross-member
24	LU+1301Z001202	Drive shaft (P version)
	LU+1301Z000201	Drive shaft (OLP version)

Avantra 36/44 OLP Control Panel Parts



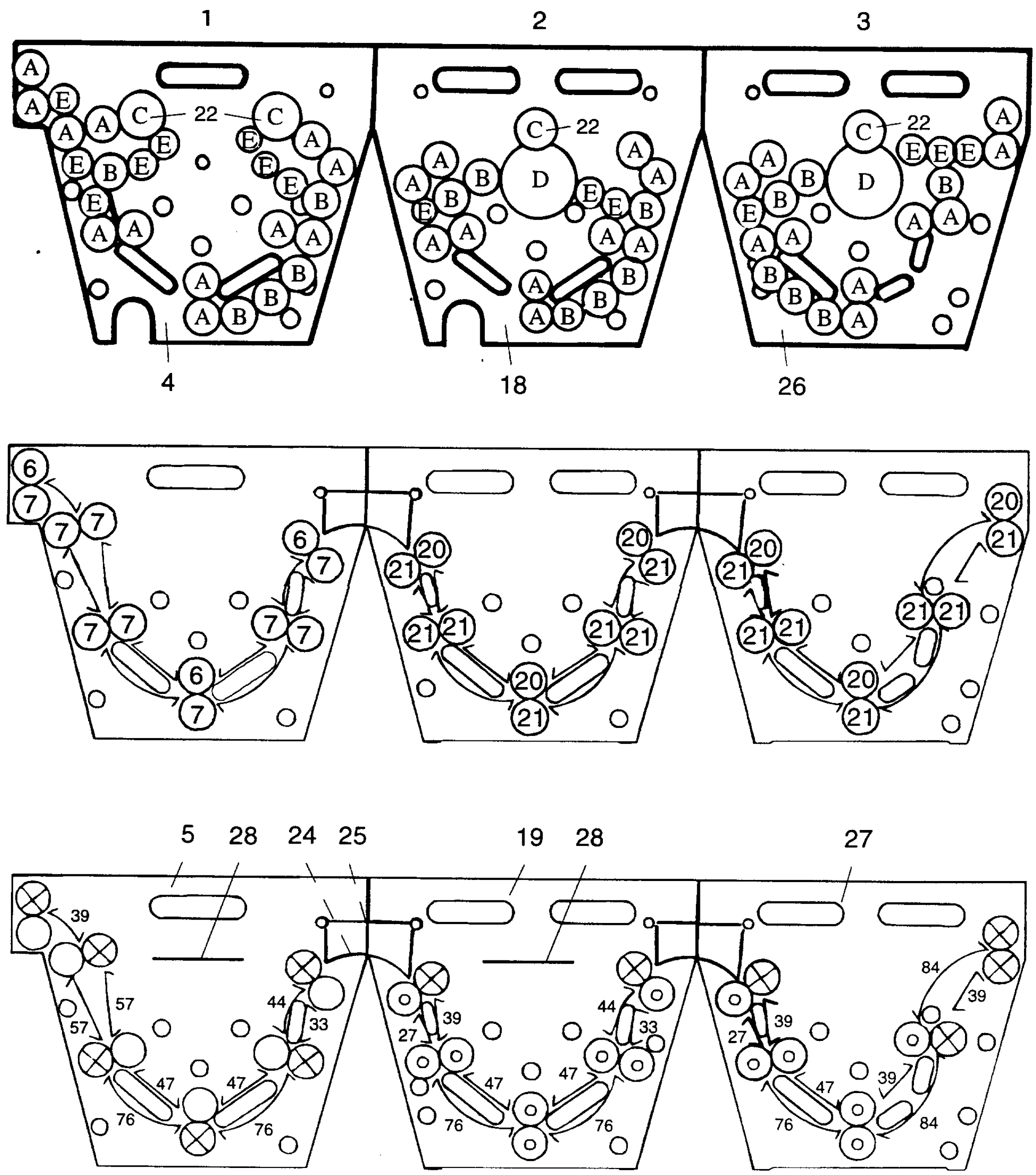
Avantra 44 OLP Control Panel



Avantra 36/44 OLP Control Panel Parts List

LU+0510Y013100	Control panel (P version) Keyboard (LU+2621X001700) (P version)
LU+6205Y010200	Board, control panel
LU+6205Y010000	EPROM
LU+0507Y013100	Control panel (OLP version) Keyboard (LU+2621X001600) (OLP version)
LU+6205Y010300	Board, control panel
LU+6205Y010000	EPROM
LU+2631Y001201	Internal keyboard cable

Avantra 36/44 OLP Rack Spare Parts



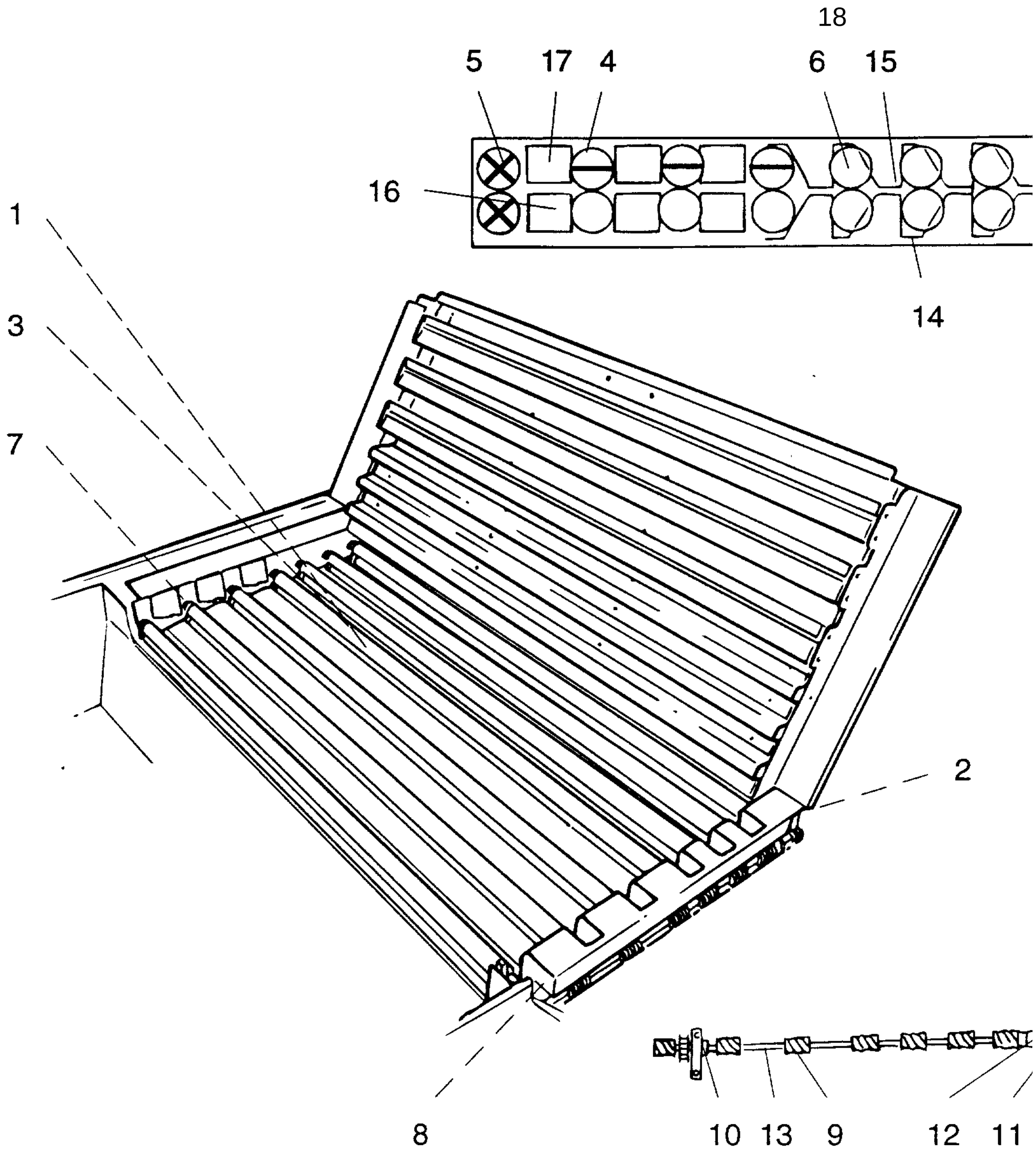
⊗	LU+1415Z040901	Rubber roller ø30.0 13/25
○	LU+1431Z040901	PUR roller, smooth ø30.0 13/25
⊙	LU+1441Z040901	PUR roller, grounded ø30 13/25

Avantra 36/44 OLP Rack Spare Parts List

1	LU+3601E210000	Developer rack
2	LU+3601E222000	Fixer rack
3	LU+3601E230000	Wash rack
4	LU+3601E210100	Side plate, right dev.
5	LU+3601E210200	Side plate, left dev.
6	LU+1351Z000104	Bearing, upper, reamed to 10.5mm
7	LU+1351Z000102	Bearing, lower, reamed to 10.2mm
8	LU+3111Z000104	Distance bar 20mm
9	LU+2008Z000301	Guide 27mm
10	LU+2009Z001601	Guide 33mm
11	LU+2022Z000301	Guide 39mm
12	LU+2009Z001701	Guide 47mm
13	LU+2009Z001801	Guide 57mm
14	LU+2019Z001301	Curved guide 39mm
15	LU+2019Z001401	Curved guide 44mm
16	LU+2019Z001501	Curved guide 76mm
17	LU+2020Z000101	Curved guide 84mm
18	LU+3601E220100	Side plate, right, fixer
19	LU+3601E220200	Side plate, left, fixer
20	LU+1351Z000103	Bearing, upper, Ø10.5
21	LU+1351Z000101	Bearing, lower, Ø10.2
22	LU+1331Z001001	Bushing
23	LU+1331Z000101	Bushing for idler
24	LU+3601E210403	Crossover for dev/fix + fix/wash
25	LU+6292X000100	Spring for crossover
26	LU+3601E230100	Side plate, right wash
27	LU+3601E230200	Side plate, left wash
28	LU+3034Z000301	Lid, SST
A	LU+1201Z201503	Gear, M= 1.5/Z = 20/Ø 10H7
B	LU+1201Z201504	Gear, M= 1.5/Z = 20/Ø 10.2
C	LU+1211Z160201	Adapter gear M = .5/2 Z = 20/6 B = 65
D	LU+1201Z421505	Gear, M= 1.5/Z = 42/Ø 10.2/B = 23
E	LU+1282Z161502	Gear, M= 1.5/Z = 16/Ø 10H7

Avantra 36/44 OLP Dryer Spare Parts

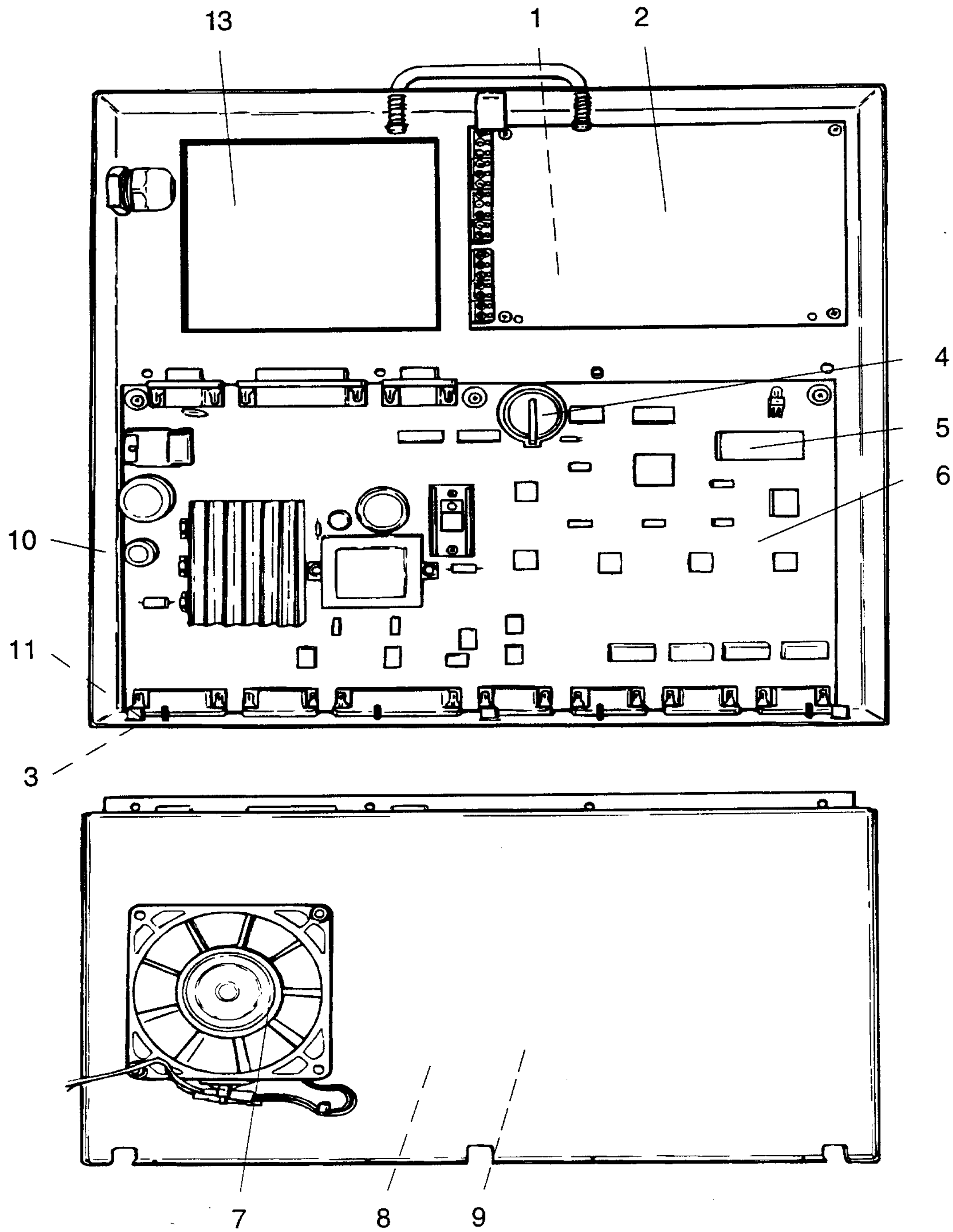
- ⊗ Heavy Rubber roller ø25.0 15/35
- ⊖ Rubber ø25.0 15/35
- ○ PUR/Teflon roller ø25 15/35



Avantra 36/44 OLP Dryer Parts List

1	LU+0401X000100 W	Heating element 220 V, 2 x 750
2	LU+0301X001000	Dryer fan
3	LU+2101Y000401	Temperature sensor PT500
4	LU+1410Z041404	Rubber roller Ø25.0 15/35
5	LU+1414Z241404	Heavy rubber Ø25.0 15/35
6	LU+1450Z041404	PUR/teflon roller Ø25/ 15/35
7	LU+1351Z000601	Thrust bearing, square
8	LU+1282Z161501	Gear, M = 1.5/Z = 16/ Ø10H7
9	LU+1221Z011503	Worm for drive shaft dryer
10	LU+1351Z201007	Thrust bearing
11	LU+1361Z004801	Bearing block
12	LU+6321X101510	Bearing bronze with collar
13	LU+1301Z000207	Drive shaft dryer
14	LU+3601E240501	Triple guide lower comp.
15	LU+3601E240601	Triple guide upper comp.
16	LU+3601E240711	Airduct lower
17	LU+3601E240811	Airduct upper
18	LU+2201Z000602	Exit guide

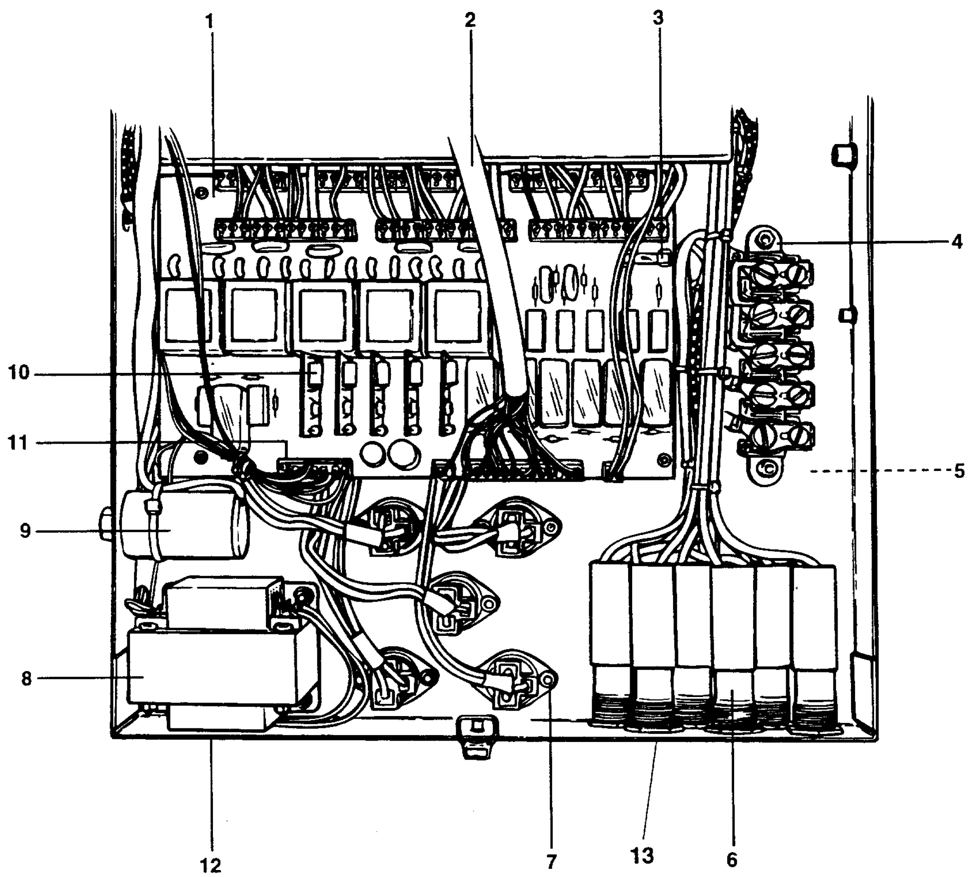
Electronics (upper) Spare Parts



Electronics (upper) Spare Parts List

1	LU+2415X100000	Fuse, 10AT, 5 x 20mm
2	LU+5202Y000100	LUTH motor board, LMB 02
3	LU+2416X006000	Fuse, 600 mAF, 5 x 20mm
4	LU+1311X000100	Lithium cell, 3 Volt
5	LU+6301Y840000 LU+6305Y010000	EPROM 36F44V02R02 (P version) EPROM 36A44V02R03 (OLP version)
6	LU+6301Y000501	LUTH computer board, LCB 01 with anti-loop
7	LU+2304Y000301	Fan, 12V
8	LU+4121Z000501	Bracket for plugs
9	LU+4121Z000401	Shield for electronics
10	LU+4101Z000301	Upper part electronics
11	LU+2601Y004201	Fuse holder
12	LU+2621Y007003	Interface cable (OLP version only)
13	LU+5305Y000101	LUTH rectifier board, LRB 01

Electronics (lower) Spare Parts



Electronics (lower) Spare Parts List

1	LU+5111Y000200	LUTH power board, LPB 01
2	LU+2621Y003201	Interconnection cable
3	LU+2415X003200	Fuse, 315 mAT, 5 x 20mm
4	LU+3111X000800	Terminal strip, 5 circuit
5	LU+4121Z000201	Protective plastic shield (NOT SHOWN)
6	LU+2401X000100	Fuse holder, complete
7	LU+3848	Power triac, 25 A
8	LU+1501X000300	Transformer
9	LU+2121X000400	Motor capacitor
10	LU+3847	Trigger Board
11	LU+2501Y003801	Molex, 2-wire
12	LU+4101Z000401	Lower part electronics box
13	LU+2411X020000	Fuse 2A, 6 x 32
	LU+2411X100000	Fuse 10A 6 x 32mm
	LU+2411X063000	Fuse 6.3A, 6 x 32mm
	LU+2411X150000	Fuse 15A, 6 x 32mm

Appendix C

Wiring Diagrams

Index

Section V: Crane

Chapter 1: Crane Mounting Instructions

1.1 Introduction

This chapter explains how to unpack and install the Avantra 36/44 crane, which attaches to the on-line processor (OLP).

This chapter covers:

- Unpacking the Crane
- Crane Installation Procedures
    - The Mounting Plate and Boom
    - Mounting the Head

1.2 Unpacking the Crane

The crane ships in a single cardboard box attached to a wooden pallet.

Tools: Strap cutters

Steps:

1. Move the packing box to the imagesetter site and place it on the right hand side of the OLP.
2. Cut the ties around the box. Lift off the top and remove the packing.
3. Lay out and check the contents against the items shown in Figure 1-1.

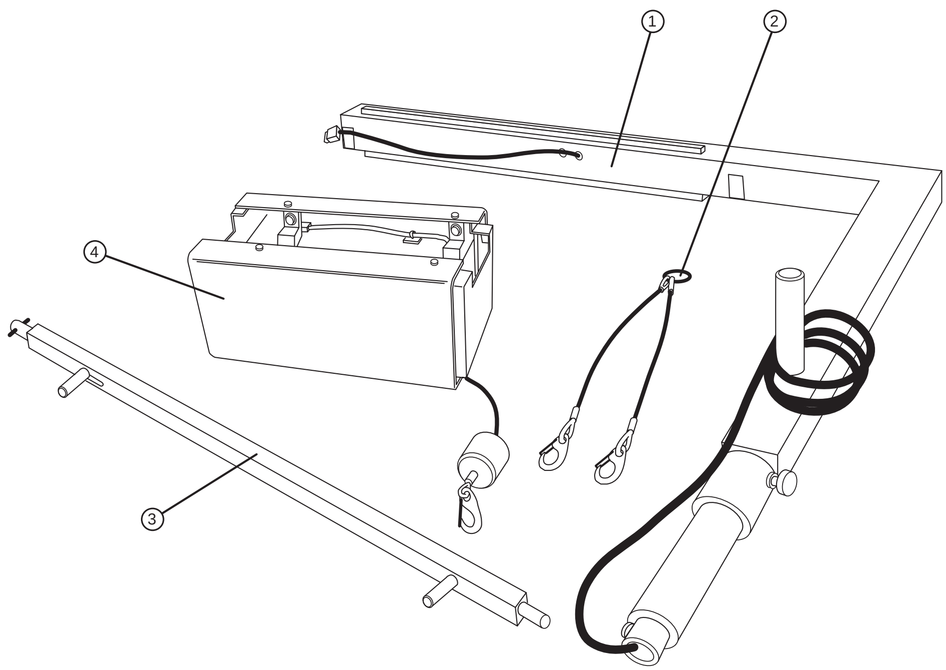


Figure 1-1 Crane inventory.

①–Boom (arm/mast assembly).②–Cassette cable.
③–Capture bar. ④–Head (rack/cassette crane).

1.3 Crane Installation Procedures

1.3.1 The Mounting Plate and Boom

Tools required: Hex driver, 17mm socket wrench

Steps

1. Power down the OLP and disconnect its power plug.
2. Remove the four (4) hex screws (top) and three (3) hex screws (bottom) in the top side panel on the right side of the OLP. Refer to Figure 1-2.

> **NOTE: Later OLP models should have the mounting plate assembly already in place.**

3. If the Mounting bracket is not in place, use a 17mm socket wrench to attach it to the frame. Use the four bolts, washers, and lock washers supplied. Refer to Figure 1-2.

> **NOTE: A 17mm socket is supplied to aid in securing the mounting bracket.**

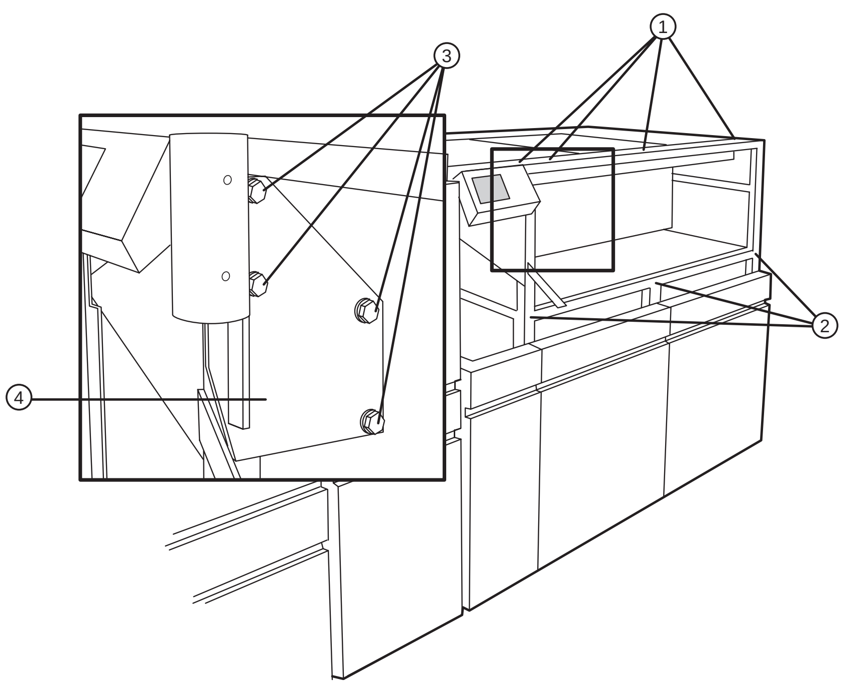


Figure 1-2 Crane mounting plate assembly.

①–Four panel hex screws (top). ②–Three panel hex screws (bottom). ③–Four bolts with washers. ④–Mounting bracket.

4. Insert the adapter into the mount and secure with the two (2) set screws and locking nuts. Refer to Figure 1-3.

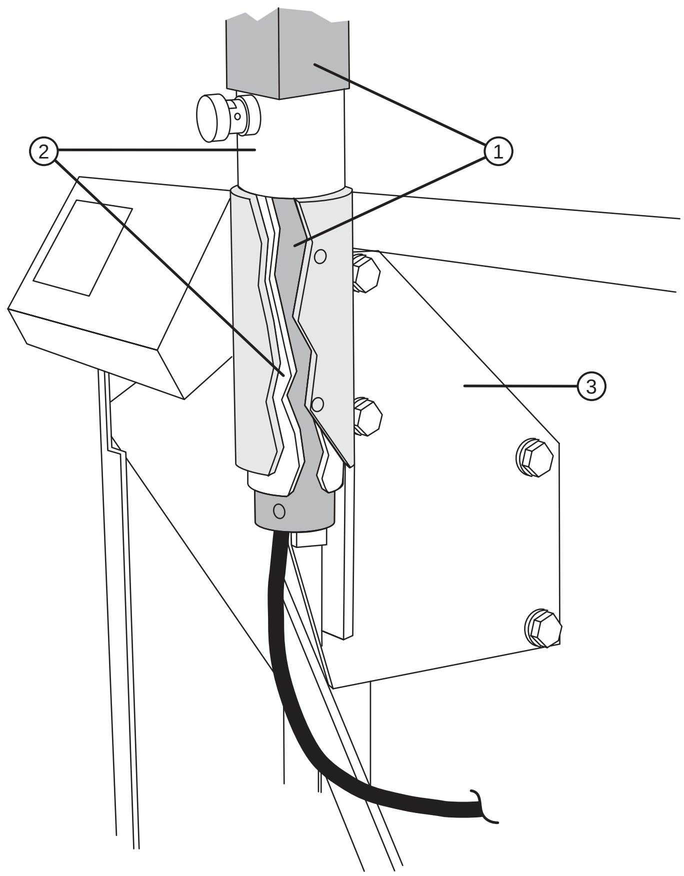


Figure 1-3 Inserting the adapter into the mount.

①–Boom. ②–Adapter (fit into mount). ③–Mount.

NOTE: Later OLP models should not require the following procedure.

5. Replace the top side panel to the OLP and verify that the panel cut-out for the crane has an acceptable fit. Refer to Figure 1-2 and Figure 1-3.

   If the fit is not good, remove the adapter and mounting plate. Re-install the plate with washers added between the mounting plate and the frame. This will improve the alignment.

6. Lift the base of the boom into the adapter/mount. Route the power cable exiting the boom base down through the mount center. Refer to Figure 1-4.
7. Lower the boom into position until the boom fits snugly into the adapter/mount. Refer to Figure 1-4.
8. With the boom/adapter in place in the mount, connect the boom power cable to the matching plug at the OLP. Refer to Figure 1-4.

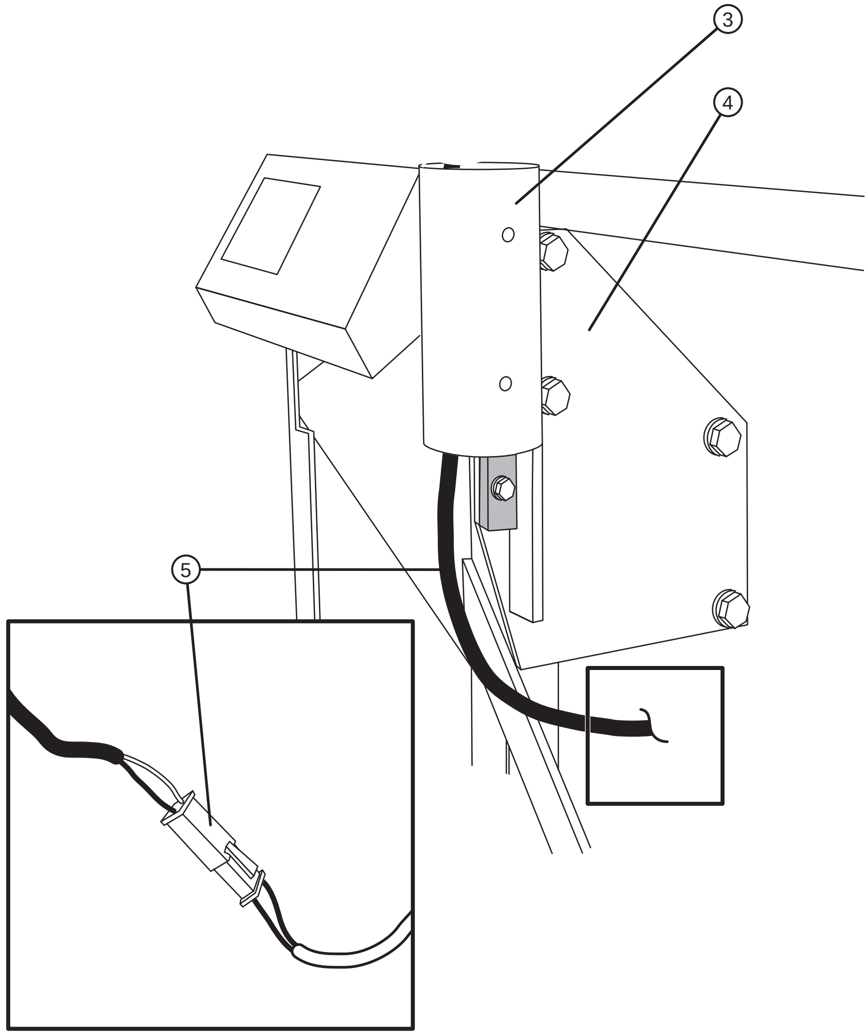


Figure 1-4 Crane power cable connections.

③–Mount. ④–Mounting bracket.
⑤–Electrical cable with connector.

9. Install the stop pin through the base of the boom, which extends below the mount. Refer to Figure 1-5. Make sure that the head of the stop pin is on the same side as the control switches.

   The locking pin locks the boom in place once the set screws have been tightened against the adapter. Make sure the locking pin is facing straight out as shown before tightening the set screws. Note that the adapter has recesses for the set screws.

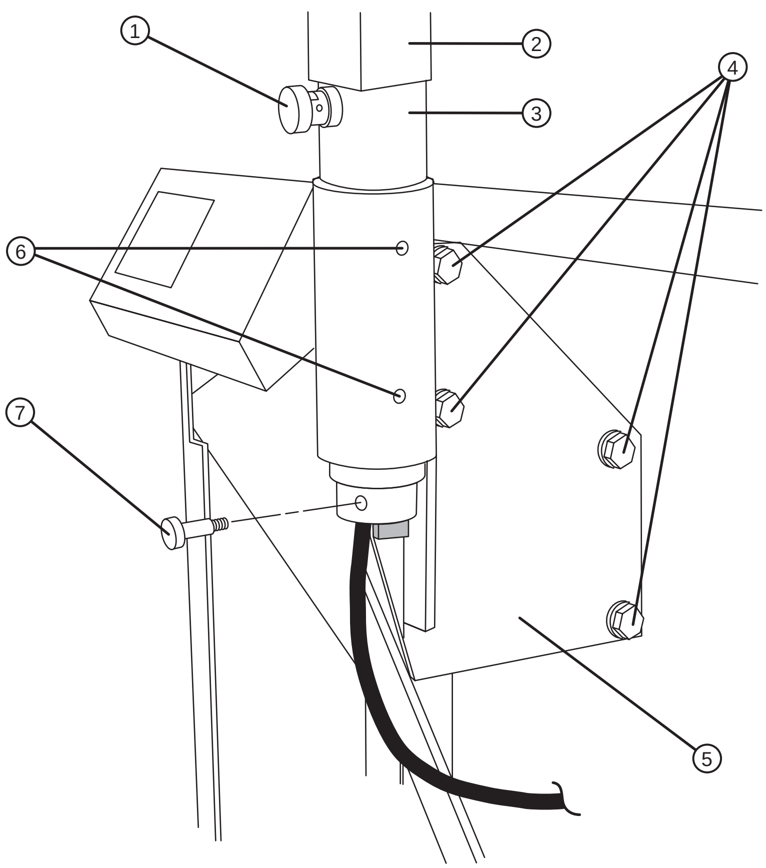


Figure 1-5 Mounting the boom into the adapter/mount.

①–Spring loaded locking pin. ②–Boom.
③–Adapter. ④–Four mounting plate bolts with washers**.**
⑤–Mounting bracket. ⑥–Two allen set screws in mount. ⑦–Stop pin.
⑧–Lock block with bolt.

1.3.2 Mounting the Head

Tools required: Flathead screwdriver

Steps

1. Using a flathead screwdriver, remove the end stop mounted at the tip of the boom arm. Refer to Figure 1-6.

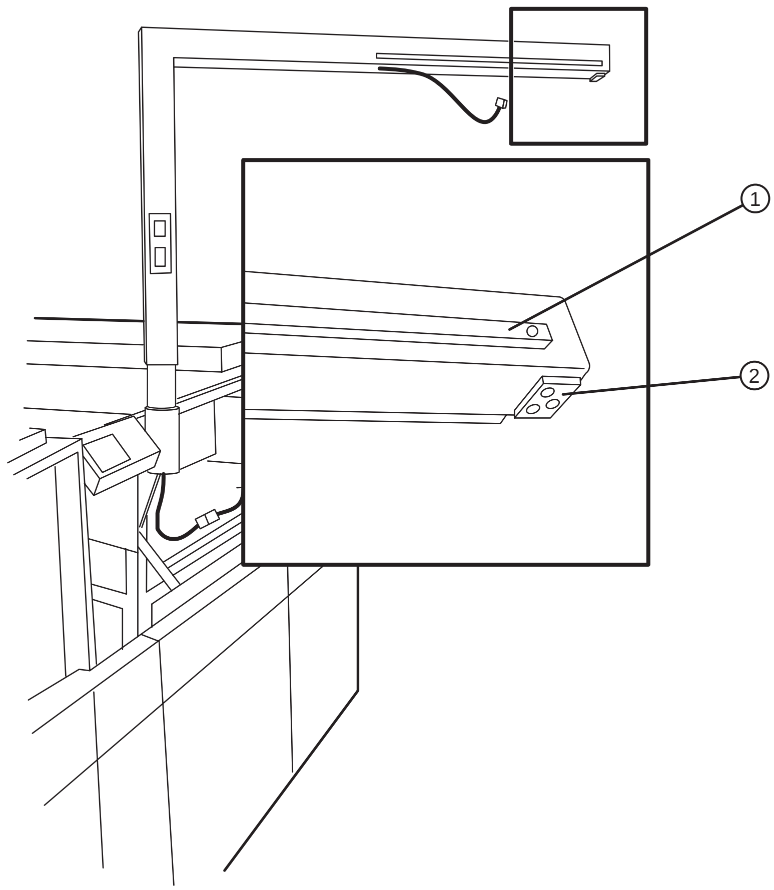


Figure 1-6 The boom with side rails and end stop.

①–Boom rail. ②–End stop.

2. Remove the plastic end cover from the head at the rear (the end farthest away from the cable exit).

   Note the power connector behind this cover.

3. Pull the gearbox vent plug found on the head in the boom travel areas. Refer to Figure 1-7.

   The plug has a tag on the end labeled “Remove Plastic Plug.”

CAUTION: Once this plug is removed the head should not be turned over on its sides for any period longer than a few minutes.

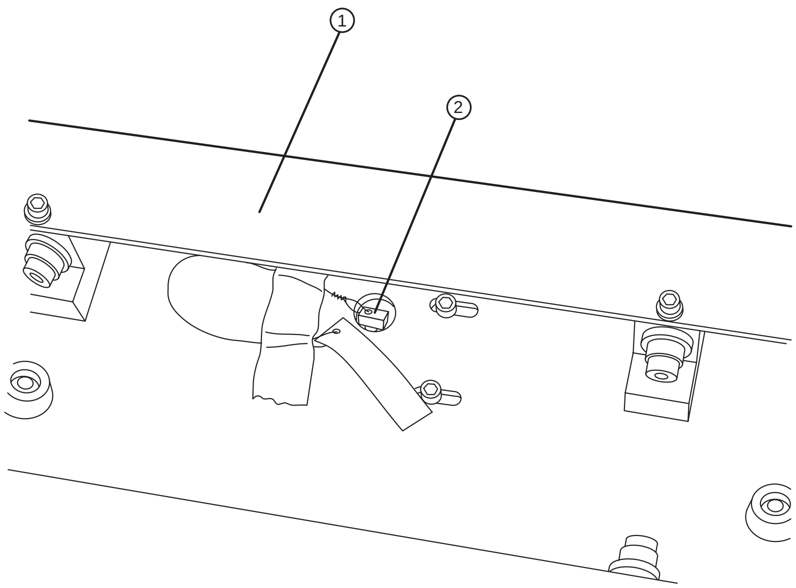


Figure 1-7 The gearbox vent plug.

①–Head (rack/cassette crane). ②–Plastic plug.

4. Place the head onto the boom arm, power connector end first. Push the first two guiding rollers over the boom rails (see Figure 1-6) and roll approximately halfway onto the boom. Refer to Figure 1-8.

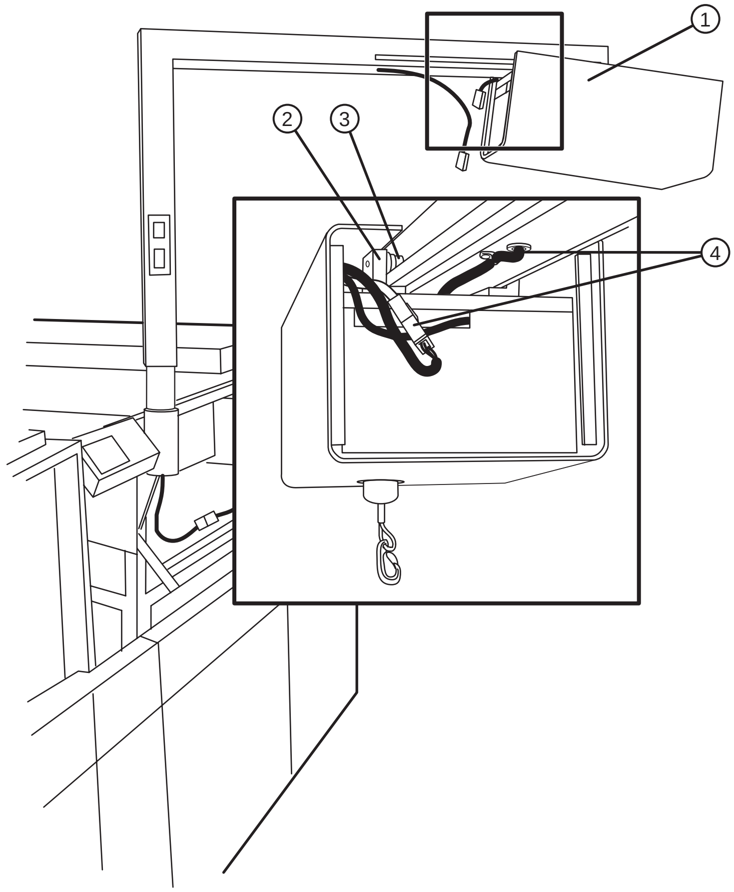


Figure 1-8 Mounting the head.

①–Head. ②–Rear mounting bracket. ③–Roller. ④–Power cable/connector.

5. While holding the head in this position, work the power cable at the bottom of the boom arm past the first set of guide roller mounting blocks on the head. Refer to Figure 1-9.

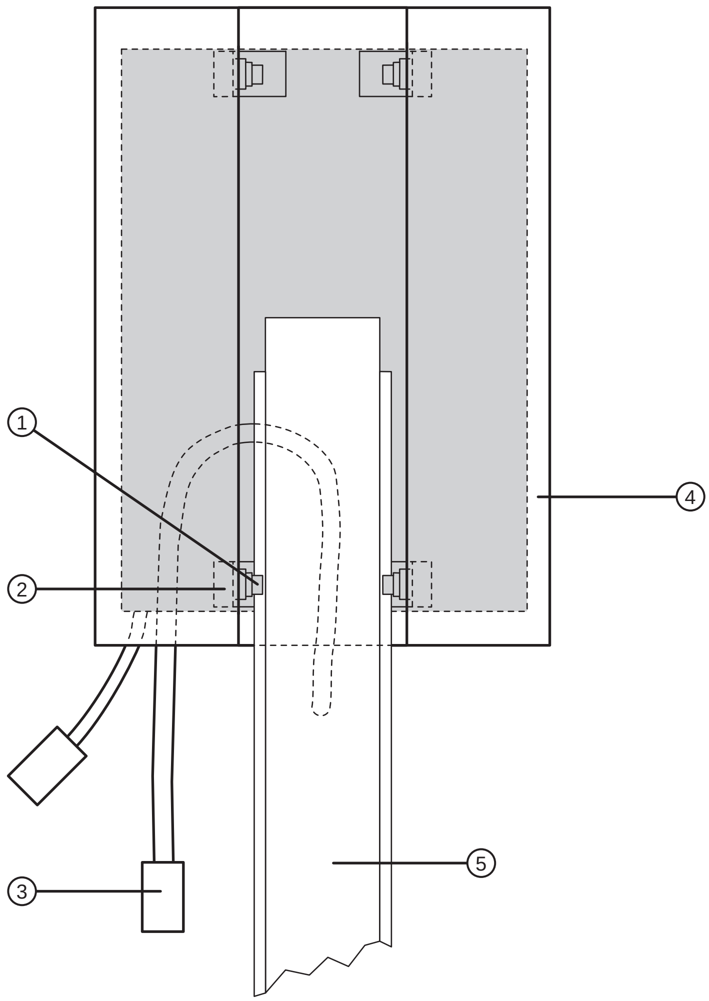


Figure 1-9 Routing the power cable.

①–Roller. ②–Rear mounting bracket.③–Power cable/connector. ④–Head. ⑤–Crane boom.

6. Loop the cable around the guide roller mounting block on the left side as viewed from above. Refer to Figure 1-9.

7. Maintain the cable routing while moving the head the rest of the way onto the boom.

   In doing so, the cable should form a loop and exit at the power connector end (rear) of the head. Refer to Figure 1-9.

   WARNING: Install the end stop at the tip of the boom now! Failure to do so could cause the head to be accidentally pushed from the boom during the steps that follow.

   ---

8. Verify that the cable is properly routed. Refer to Figure 1-9.
9. Connect the power cables from the boom and from the head (see Figure 1-9).
10. Move the head to its limit against the end stop at the boom tip. Pull out any slack left in the cable and secure to the wire tie securing block at the end of the head.
11. Roll the head back and forth several times while observing the cable routing to ensure it is properly placed.
12. Switch on the OLP power.
13. Switch on the power at the crane control panel and check the operation of the unit.
14. Operate the crane in the up direction until the steel ball recedes into the cover. Check that the upper limit switches activate before the ball fully recedes into the cover. Adjust the switches as required.
15. Re-install the OLP top side panel and the crane head end cover.
16. Refer to the *Avantra 36/44 User Guide* for operation instructions.

Chapter 2: Crane Component Removal / Replacement

2.1 Introduction

This chapter explains how to remove and replace components within the Avantra 36/44 crane, which attaches to the on-line processor (OLP).

This chapter covers:

- Crane Removal/Replacement Procedures
    - Crane On/Off Switch
    - Crane Motor
    - Crane Slack Safety Switch
    - Crane Cable

2.2 Crane Removal/Replacement Procedures

2.2.1 Crane On/Off Switch

Tools Required: phillips head screwdriver

Remove:

1. Power down the OLP and disconnect its power plug.
2. Remove the top covers and, using a phillips head screwdriver, remove the four (4) screws on the top and three (3) screws on the bottom of the right side panel. Refer to Figure 2-1 and 2-2. Lift and remove the side panel.

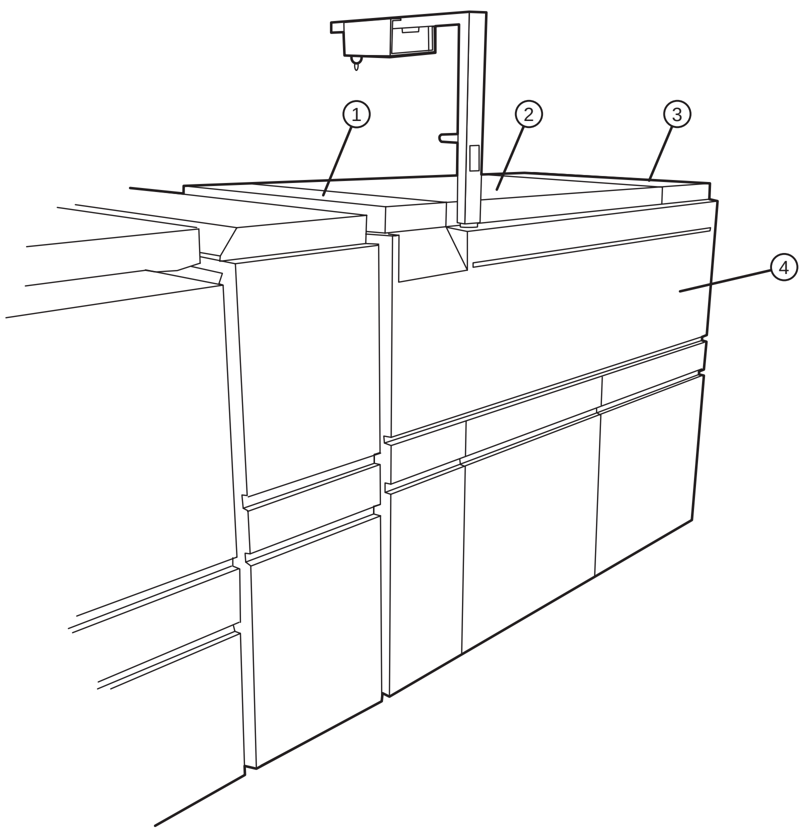


Figure 2-1 OLP cover and panel identification and location.

①–Forward top cover. ②–Middle top cover. ③–Rear top cover. ④–Top side panel.

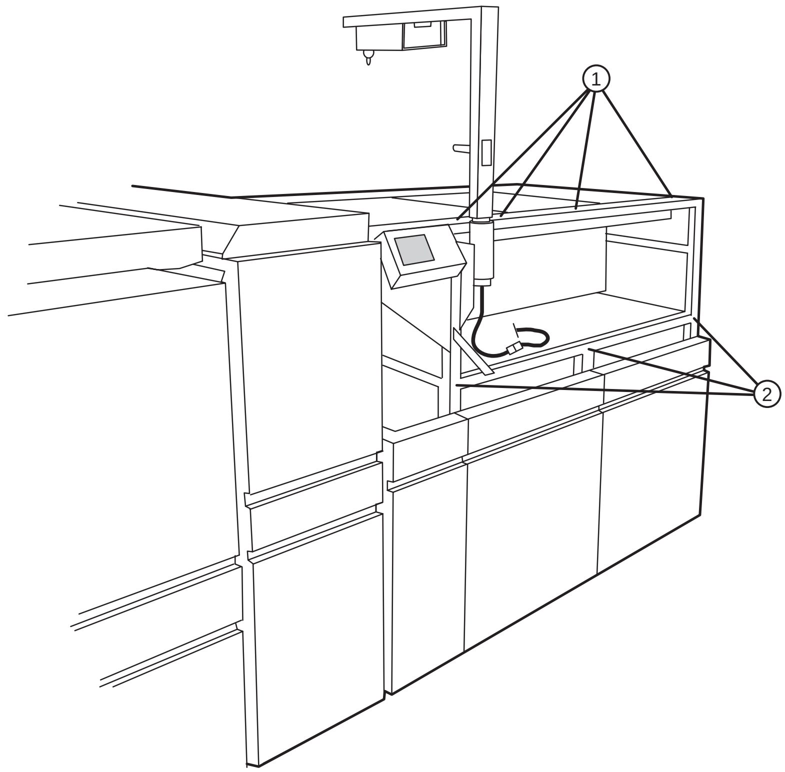


Figure 2-2 Screw locations OLP top side panel.

①– Location 4 hex screws top of side panel.
②–Location 3 hex screws bottom of side panel.

3. Disconnect the power cable coming from the crane assembly to the plug inside the OLP. Figure 1-3.

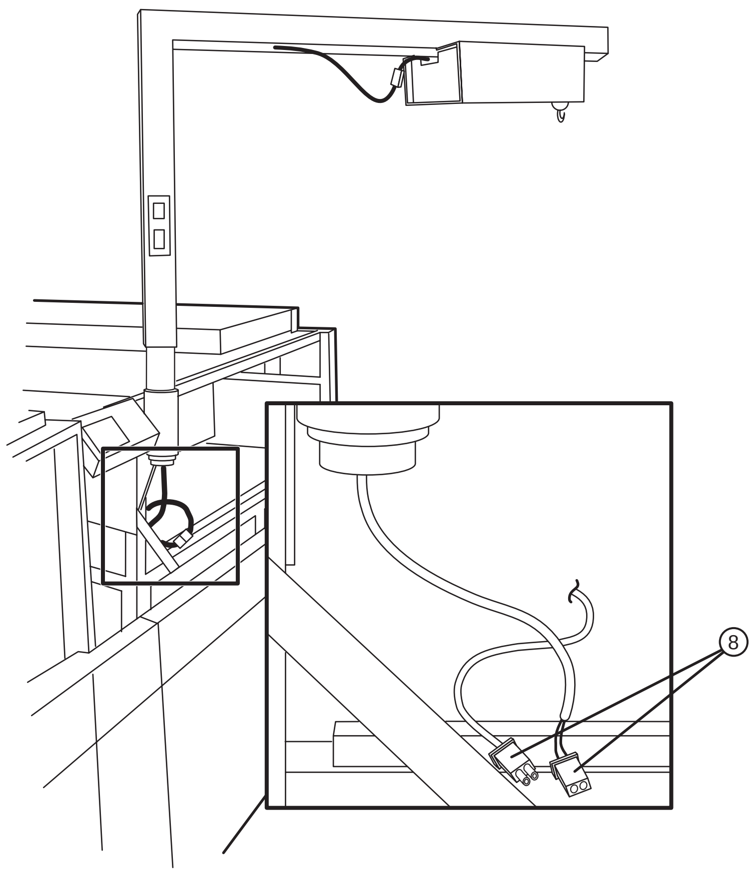


Figure 2-3 The crane power cable.

①– Power cable/connector.

4. Using a phillips head screwdriver, remove the two (2) screws attaching the switch plate to the crane arm. Figure 1-4.

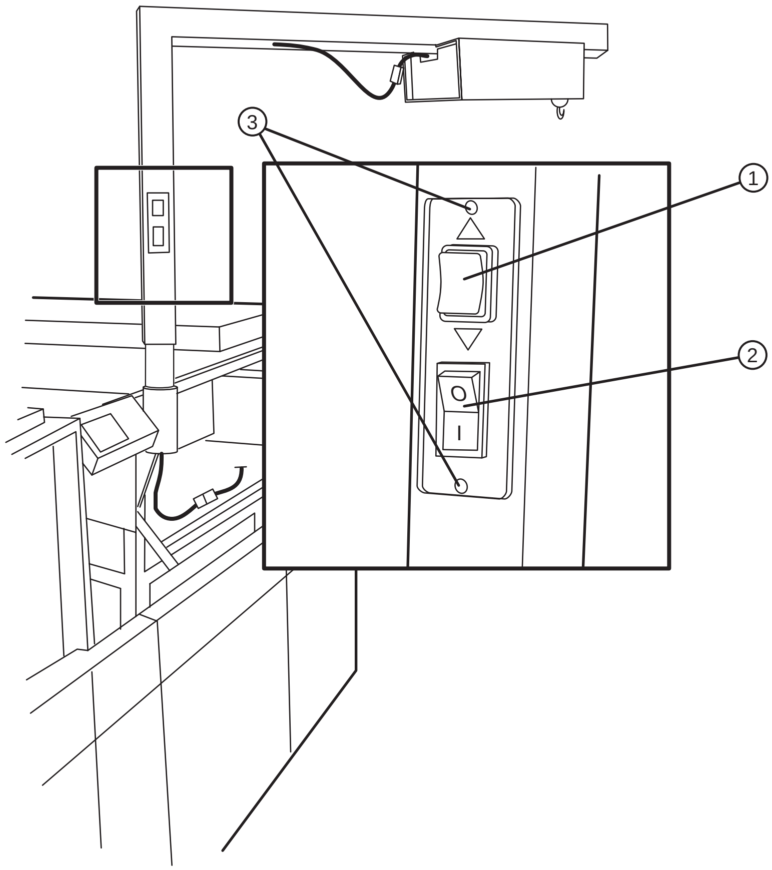


Figure 2-4 Screw location on switch plate.

①– Up/down switch. ②–On/off switch. ③– Phillips screws.

5. Pull the plate out gently noting the switch wiring for proper replacement. Figure 1-5. Remove the wires.

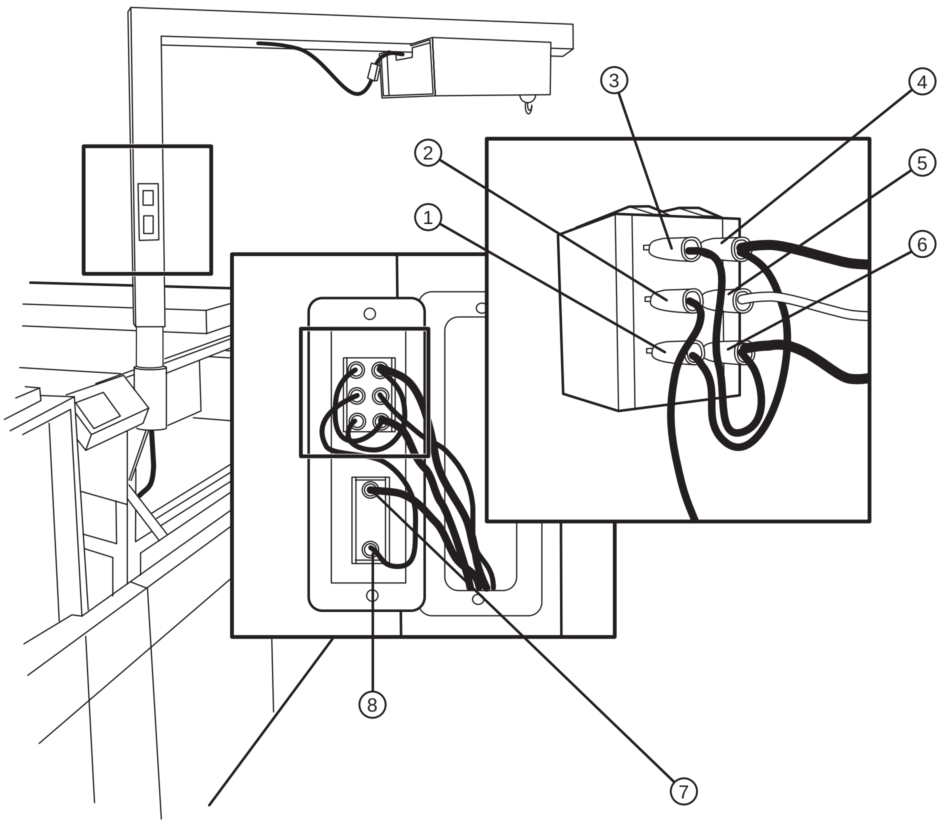


Figure 2-5 Crane switch wire color and location.

①–Light blue. ②–Thin black. ③–Thin brown.
④–Dark blue/light blue. ⑤–Thick white.
⑥–Thick brown/thin brown. ⑦–Thick black. ⑧–Thin brown.

Replace:

1. Reverse the removal procedures above.

2.2.2 Crane Motor

Tools Required: Phillips head screwdriver, flat head screwdriver, 9/64" hex wrench, 5/32" allen wrench

Remove:

1. Using the on/off switch, lower the crane cable as far as possible.
2. Using a phillips head screwdriver, remove the four (4) screws on the front and back cover of the head.
3. Disconnect the power cable at the end of the head.
4. Using a flat head screwdriver, remove the three (3) screws in the end stop at the front of the boom. Figure 1-6.
5. Carefully roll the head off the boom rails. Figure 1-6. Lay the head down on a flat surface with the top (open) end up.

.

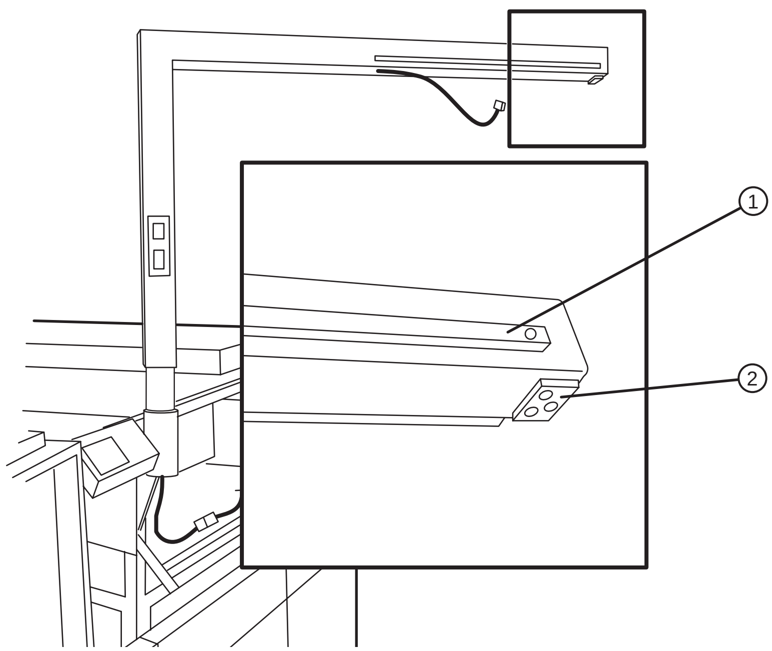


Figure 2-6 Boom rails and end stop.

①–Boom rail. ②–End stop.

6. Using a 9/64" hex wrench, remove the four (4) hex screws at the top of the head.

CAUTION: While removing the screws, support the motor at the cable end.

---

7. Pull the cable and hook up through the hole in the head.
8. Spread the sides of the head and slide the head assembly free.
9. Cut the wrap to free the motor power cable on the top of the head. Using a pin removal tool, remove the pins in the plug.

WARNING: Make note of the location of the wires for replacement purposes.

---

10. Push the wire through the hole.
11. Flip the motor assembly over and remove the P-clamp holding the wire in place.
12. Using a 5/32" allen wrench, remove the two (2) screws attaching the motor to the plate.

Replace:

1. Replace the 5/32" allens.
2. Align the motor coupler with the coupler on the mount until they engage.
3. Slide the motor forward.
4. Tighten the hex screws at the top.
5. Put the wire end through the hole in the plate.
6. Attach the P-clamp.
7. Re-attach the plug to the wire.
8. Plug the wire in.

2.2.3 Crane Slack Safety Switch

Tools Required: Phillips head screwdriver, flat head screwdriver, 9/64" hex wrench

Remove:

1. Using a phillips head screwdriver, remove the four (4) screws on the front and back cover of the head.
2. Disconnect the power cable at the end of the head.
3. Using a flat head screwdriver, remove the three (3) screws in the end stop at the front of the boom. Figure 1-6.
4. Carefully roll the head off the crane boom. Lay the head down on a flat surface with the top (open) end up.
5. Using a 9/64" hex wrench, remove the four (4) hex screws at the top of the head.

CAUTION: While removing the screws support the motor at the cable end.

6. Pull the cable and hook up through the hole in the head.
7. Spread the sides of the head and slide the head assembly free.
8. Using a phillips head screwdriver, remove the two (2) screws that attach the switch to the block. Figure 1-9.

Replace:

1. Reverse the removal procedures above.

2.2.4 Crane Cable

Tools Required: phillips head screwdriver, flat head screwdriver, 9/64" hex wrench, pliars

Remove:

1. Using the up/down switch, lower the crane cable as far as possible.
2. Using a phillips head screwdriver, remove the four (4) screws on the front and back cover of the head.
3. Disconnect the power cable at each end of the head.
4. Using a flat head screwdriver, remove the three (3) screws in the end stop at the front of the boom. Figure 1-6.
5. Carefully roll the head off the boom rails. Figure 1-6. Lay the head down on a flat surface with the top (open) end up.
6. Using a 9/64" hex wrench, remove the four (4) hex screws at the top of the head. This Detaches The Motor Assembly.

CAUTION: While removing the screws, support the motor at the cable end.

7. Pull the cable and hook up through the hole in the head.
8. Spread the sides of the head and slide the head assembly free.

9. On the motor side, remove the E-clip to detach the cable sheave pin and sheave. Figure 1-7.

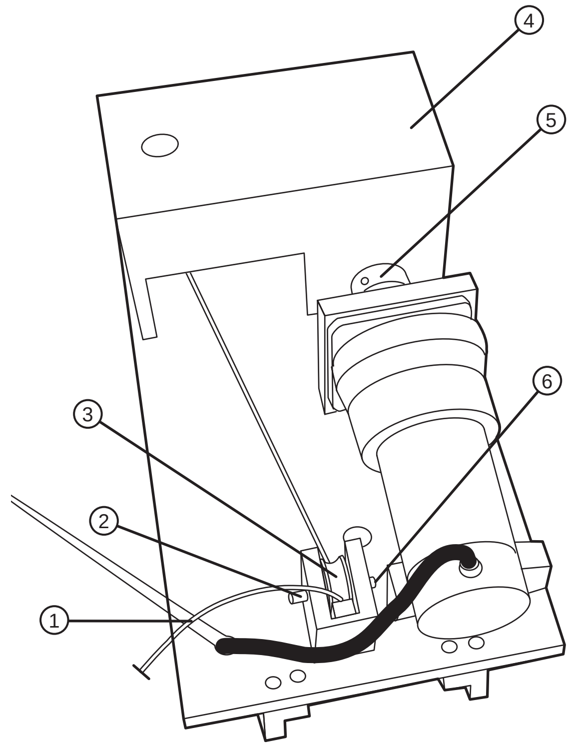


Figure 2-7 E-clip, Sheave, and sheave pin.

①–Cable. ②–Sheave pin. ③–Sheave.
④–Drive assembly. ⑤–Drive coupler. ⑥–E-clip.

10. Turn the assembly over and remove the four (4) 3/16" allen screws that connect the top plate to the cable drum assembly. Figure 1-8.

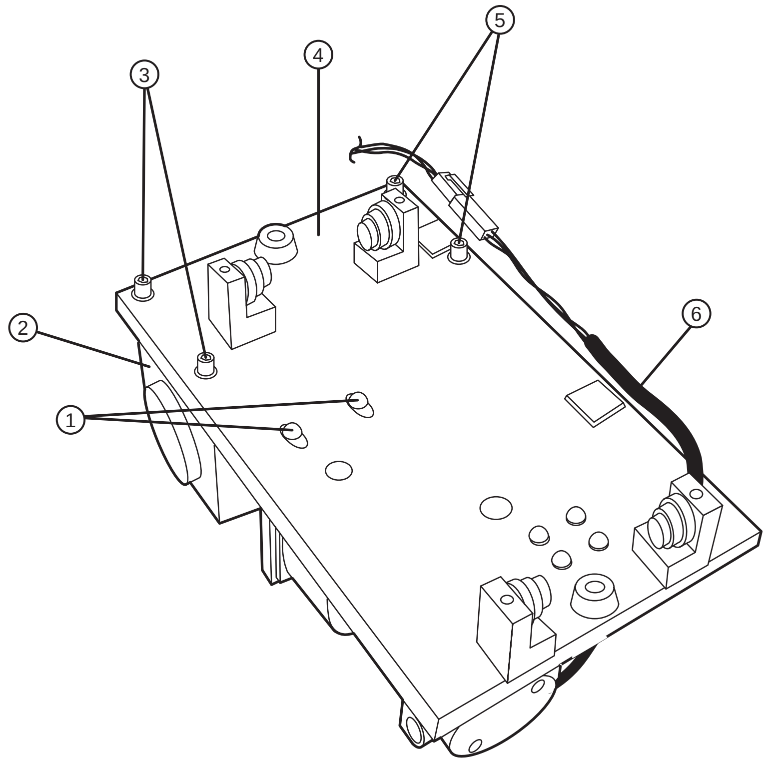


Figure 2-8 Top plate.

①–Two 5/32" allen screws. ②–Cable drum assembly.
③–Two 3/16" allen screws (long). ④–Top plate.
⑤–Two 3/16" allen screws (short). ⑥–Motor power cable.

11. Remove the E-clip from the guiding bar and slide the bar out. Figure 1-9.
12. By hand, turn the drive coupler clockwise to unwind the cable. Figure 1-9.
13. Using a 5/32" hex wrench, remove the screw from the cable guiding block. Figure 1-9.

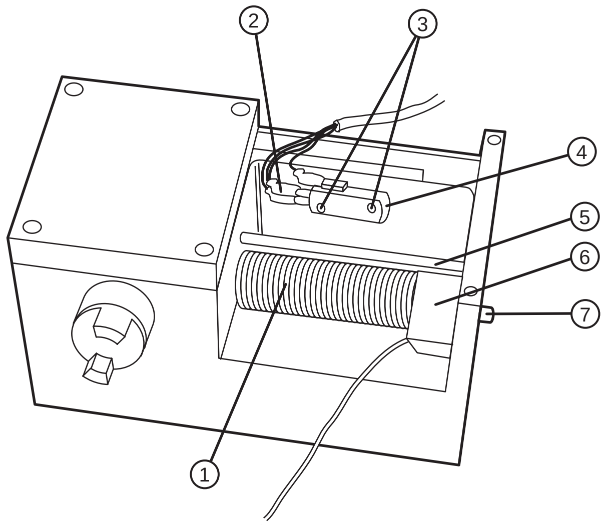


Figure 2-9 Cable drum with guiding bar and block.

①–Cable drum. ②–Slack safety switch wires.
③–Two phillips screws for safety switch. ④–Slack safety switch.
⑤–Guiding bar. ⑥–Guiding block. ⑦–One 5/32" hex screw.

14. Continue to turn the drive coupler clockwise until the set screw is visible in the drum. Figure 1-10. Use a 1/16" allen wrench to loosen the set screw.

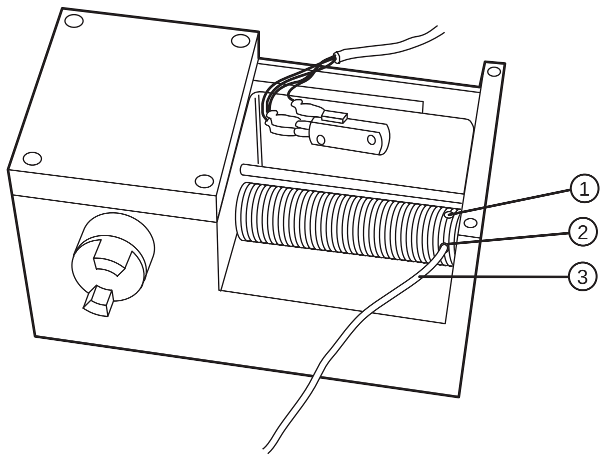


Figure 2-10 Set screw, cable hole.

①–Set screw (1/16" allen). ②–Cable hole. ③–Cable.

15. Slide the cable out of the drum.

Replace:

1. Take about an inch of new cable and bend it at a 90 degree angle using a pliars.
2. Insert the bent cable end into the cable hole in the Drum. Figure 1-10.
3. Tighten the set screw. Figure 1-10.
4. Turn the drive coupler counterclockwise while maintaining tension on the cable. Figure 1-7. Wrap the cable at least one and one half times around the drum.
5. Re-attach the guiding block. Figure 1-10.
6. Continue to turn the drive coupler until the cable wraps 2-3 times more on the drum. Keep checking that there is no slack on the cable.
7. Reverse the procedure from Step 11 above.

Appendix A
Spare Parts

OLP Crane

067246-012	Capture bar
067246-003	Motor/Carriage assembly
067246-004	"Up/Down" rocker switch
067246-005	Circuit breaker/On-Off switch
067246-006	Cable assembly
067246-011	Cassette chain
067246-016	Carriage cover
067246-017	Cable slack switch w/ actuator
067246-018	Cable slack switch w/o actuator
067246-019	Hoist limit switch

Index